Jordan Journal of Modern Languages and Literatures Vol.16, No. 2, 2024, pp 557-574

JJMLL

Literary Metaphor Comprehension in the Rational and Experiential Cognitive Styles of Human Thinking

Jana Kuzmíková *
Department of the History of Slovak Literature, Institute of Slovak Literature, Slovak Academy of Sciences, Slovakia

Ján Kuzmík
Department of Cell Biology, Charles University, Czech Republic

Received on: 24-10-2022 **Accepted on: 2-3-2023**

Abstract

Prior research on the poetic metaphor interpretation has focused on describing metaphoric structure and identifying its principles by observing semantically mapped properties of a metaphor. Cognitive literary studies have highlighted an experimental approach to the metaphoric thinking. The experimental approach examines, among others, the empirical processes of metaphor interpretation and comprehension. For metaphor processing, emergent meanings are crucial. We already have many reports, findings and normative data on metaphor processing, but individual cognitive mechanisms and variations across people have received an insufficient attention. To address this issue, this empirical study examines the influence of rational (analytical) and experiential (intuitive) cognitive styles on the comprehension of a poetic literary metaphor. In our statistical analysis, we have used a fractional pooling of the participants. It highlights the non-identical metaphor processes in rational and experiential cognitive preferences. According to our findings, people with a preference for the experiential cognitive style produce relatively more emergent metaphorical meanings than people with a preference for the rational cognitive style. These findings contribute to the more complex knowledge of the metaphoric thinking consequences.

Keywords: Literary metaphor; Interpretation of metaphor; Rational (analytical) cognitive style; Experiential (intuitive) cognitive style; Emergent metaphorical meaning

1. Introduction

Metaphors have been analyzed since antiquity, for example in Aristotle's *The Poetics* and *The Rhetoric*. In modern times, an enormous number of studies have focused on this trope, among which the most important are Richards (1936), Jakobson (1956), and Black (1962). In addition to describing and analyzing the metaphoric structure and principles, cognitive linguistics and cognitive psychology have asked how people produce and comprehend metaphors (Lakoff and Johnson 1980; Ortony 1993; Turner 1996; Bowdle and Gentner 2005). Consequently, new cognitive models and research methodologies have been proposed (Glucksberg 2003; Lakoff 2008; Utsumi 2011; Steen 2015; Gibbs 2017).

* Doi: https://doi.org/ 10.47012/jjmll.16.2.16
* Corresponding Author: **jana.kuzmikova@gmail.com**

In cognitive literary studies and cognitive linguistics it is generally acknowledged that we comprehend novel literary metaphors mainly on the basis of emergent meanings (Semino 2005; Ricoeur 1977), properties (Vega-Moreno 2004) or features (e. g., Black 1962; Indurkhya 2006). According to conceptual metaphor theory (CMT), the emergent meanings, properties or features are not present, or are merely subsidiary, in the target and source domains when those are regarded as single words or separate concepts. They become salient, however, in the comprehension of a metaphor in its entirety (e. g., Becker 1997; Nueckless and Janetzko 1997; Gineste et al. 2000; Utsumi 2005, 151-152). Fauconnier (2006, 22) describes a cognitive operation (blending) which consists of integrating partial structures from two separate domains into a single structure with emergent properties within a third domain. For example, consider the novel literary metaphor [*Pressing in upon the street, from every shop came the sounds of children crying and an accordion; they made the streets slippery*] "*Z každého obchodu doliehali na ulicu zvuky detského plaču a akordeónu, ulice boli od nich šmykľavé.*" (Horváth 2010, 125, translation J. Kuzmíková). While mapping this metaphor, one can recognize the basic relational scheme *Filling the street (as a container) with wet and slippery material makes the street (like a road, a trajectory) slippery* (see Kuzmíková 2018). The relatively direct meaning of the metaphor is: *The urgency of the crying and the music hit the streets like a flood, and they became insecure*. The emergent elements which help to understand the metaphor are "a flood" and "insecure".

Emergent meanings of this metaphor, as well as of every novel, original metaphor, will be created in accordance with the reader's background knowledge and his/her emotions. One of the emergent and at the same time creative meanings of the "slippery metaphor" may be *Life even in cooperation with art* (= accordion) *does not fulfill human expectations* (= crying), *which causes uncertainty/disharmony* (= slipperiness) *on a person's way of life* (= street). The creative interpretation turns the target "street/s" into "life" and emerges as a novel relationship between the target "street/s" and the sources "crying" and "an accordion".

Our cognitive ability to create diverse metaphorical meanings is extensive, but there are some differences between decoding conventional and innovative metaphors. The comprehension of conventional or lexical metaphors does not require a special effort in their processing (Blank 1988; Bowdle and Gentner 2005). By contrast, the processing of original, innovative metaphors demands a greater effort, and this is manifested in the longer time duration of the processing of original metaphors (Giora 2003; Columbus at al. 2014).

There are also findings that a briefer mental effort is exerted in creating the meanings/features of separate concepts (literal expressions) than in the creation of emergent metaphorical meanings (Bambini et al. 2019). A respondent who manages to describe the single word "road" is reaching into an already-constructed mental lexicon, containing the hitherto acquired and classified features of the concept "road". The meaning of the word "road" is prepared beforehand in the lexicon, directly accessible and conceptually structured in complex mental schema. If the respondent's task is to describe the target domain "road" in the context of *the given metaphor*, his/her mind probes in a wider circle of possible meanings. The search is made in a more extensive personal encyclopedia. Metaphor mapping requires a

more complex referential judgment for emergent meanings as compared with the autonomous description of the single word "road". Hence for evoking the qualities of the separate concepts deposited in the mental lexicon, for example in assigning to the word "people" the feature "unteachable", it is normally sufficient to activate a more automatic cognitive competence than is involved in the multiple projections of the target domain "people" in the metaphor "*people are joining together in pure liquid*". Testifying to the difference, indirectly, are the empirical findings that a more automatic categorization process elicits meaning of conventional metaphors; a more deliberate comparison process elicits comprehension of novel metaphors (Bowdle and Gentner 2005; Glucksberg 2008).

Despite the universality of metaphoric thinking, metaphor processes are affected by culture and language (e. g., Boers 2003; Kövecses 2005; Colston 2005), background knowledge (Indurkhya 2007) and discursive framework (Steen 2015, 2017; Semino 2008). It is relevant to examine what other dispositions and mechanisms influence metaphor comprehension.

The premise of Fetterman et al. (2016) is that metaphoric thinking is more common among some people than others. In their study, they used conceptual metaphors conventional in form and content, which typically occur in everyday talking and experiences. They argue that metaphor *usage* does not correlate with intellectual abilities or with five personality factors (Big 5). At the same time, they have pointed out that people who have a greater tendency to use metaphors are more susceptible to metaphor transfer effects (Landau et al. 2010) than those who prefer the literal expressions. An example of the metaphor transfer effect is that people are less ethical when they perceive their environment as darker (vs. lighter), which is consistent with the occurrence of metaphors that link darkness and immorality (Zhong, Bohns & Gino 2010). These phenomena do not belong to the rational or analytical mentality.

A metaphor can evoke affective reaction because it usually conveys a subdued emotion or sentiment. Rai et al. (2019) demonstrate that the emotion driven interpretation is often preferred over the interpretation without an emotion. Emotionally charged consideration and decision making belong to System 1 thinking (quick, automatic, parallel, unforced, associative, implicit qualities). System 1 thinking includes innate mental activities as well as other dispositions that become *intuitive* through prolonged *experience* (Stanovich and West 2000; Kahneman 2011). The slower, conscious and verbal System 2 is analytical, and its qualities are attributes of the *rational* system of information processing (Stanovich and West 2000; Kahneman 2011). The dimensions of these two systems are related to the rational and experiential thinking styles (Pacini and Epstein 1999). These thinking styles are complementary, not opposite, but the involvement of each one of them varies across people.

Kuzmíková (2018) postulates that the highly rational and at the same time less experiential, i.e. analytical person may perceive and solve poetic metaphor differently from a person of the opposite, intuitive disposition, namely one who has higher experientiality and lower rationality. Our current intention is to elaborate this research perspective using poetic literary metaphors. Since it is preferred to apply emotions in metaphor processing (Rai et al. 2019, 6), and, at the same time, emotionally charged consideration and decision making belong to System 1 thinking (Kahneman 2011), we expect the more experiential/intuitive people to have an advantage in metaphoric associative thinking and producing

emergent metaphor meanings, as necessary elements for metaphor comprehension. Therefore, in this paper, we examine the qualities of the metaphorical domains and the emergent meanings produced by the predominantly experiential (intuitive) and the predominantly rational (analytical) respondents.

1.1 Hypothesis

The hypothesis of this study states that in the interpretation of poetic metaphor and the production of its domain-focused and emergent meanings, there are differences between the predominantly rational (analytical) and the predominantly experiential (intuitive) recipients. Because of their verbal abilities, the more rational participants will produce more meanings for the literal expressions (separate concepts). Conversely, because of their emotional dispositions, the more experiential (intuitive) participants may be more susceptible to metaphor-related inputs and will produce more emergent meanings.

2. Method

2.1 Participants

Our aim was to divide participants into three groups, namely more rational (analytical), more experiential (intuitive), and balanced. The category of the balanced participants was used as a means to distinguish better between more rational and more experiential participants. To maximize the odds of obtaining our hypothesized effect, our target sample size for study was 93 (31 in each group), which allowed us power of more than 80% to detect a medium effect using the Mann-Whitney test (d = 0.7).

Nevertheless, we did not know beforehand how many of the recruited participants were more rational, more experiential or balanced. For this reason we extended the minimum sample (3 x 31 persons) to 110 adult participants. We decided to cover a wider spectrum of population as regards age, employment (students in various fields of study and employees in various professions) and sex[2] (27 men and 74 women). Volunteers were from Comenius University and the local neighborhood community in Bratislava. We excluded linguistics and literature scholars and students, because they were likely to be familiar with the issue of metaphor. All participants completed the questionnaire anonymously with pencil and paper. In the entire battery of tests none of the tasks involved any time pressure. Estimating that it took approximately 40 minutes to complete the tasks, we recommended (but did not require) those participating to finish the entire test session within 50 minutes, so as to help participants at home to remain focused. Participants were instructed not to use any dictionary, internet or other linguistic or literary sources. Five of the participants did not fill out more than 10% of the questionnaire tasks (an a priori criterion) and four of them failed to complete the Rational-Experiential Inventory (REI), so we excluded these 9 non-compliers. Among the remaining 101 participants, the response rate was 100%. All participants were native speakers of Slovak and they agreed to participate without payment. The mean age in the sample was 26.4±8. The mean rationality attained a score of 67±12; the mean experientiality equaled 64±12. Informed consent was obtained from participants.

2.1.1 Categorization of participants

We divided participants administering the established questionnaire Rational-Experiential Inventory-40 (Pacini and Epstein 1999) for the required groups of predominantly rational and predominantly experiential participants. Rational-Experiential Inventory (REI) measures the preference for a rational or an experiential processing of information based on ability (Čavojová et al. 2013, 54). The authors of the REI questionnaire created both a long and a short version. We used the long version, which involves 40 items in four categories: Rational ability and Rational engagement, Experiential ability and Experiential engagement. Rational-Experiential Inventory-40 is currently widely used throughout the world (Cools and Van den Broeck 2007) and validated (e.g., Witteman et al. 2009; Lee 2005; Sirota et al. 2014); its reliability in various research projects for every subscale assessed by Cronbach's alpha is approximately 0.8 (Field and Hole 2003).

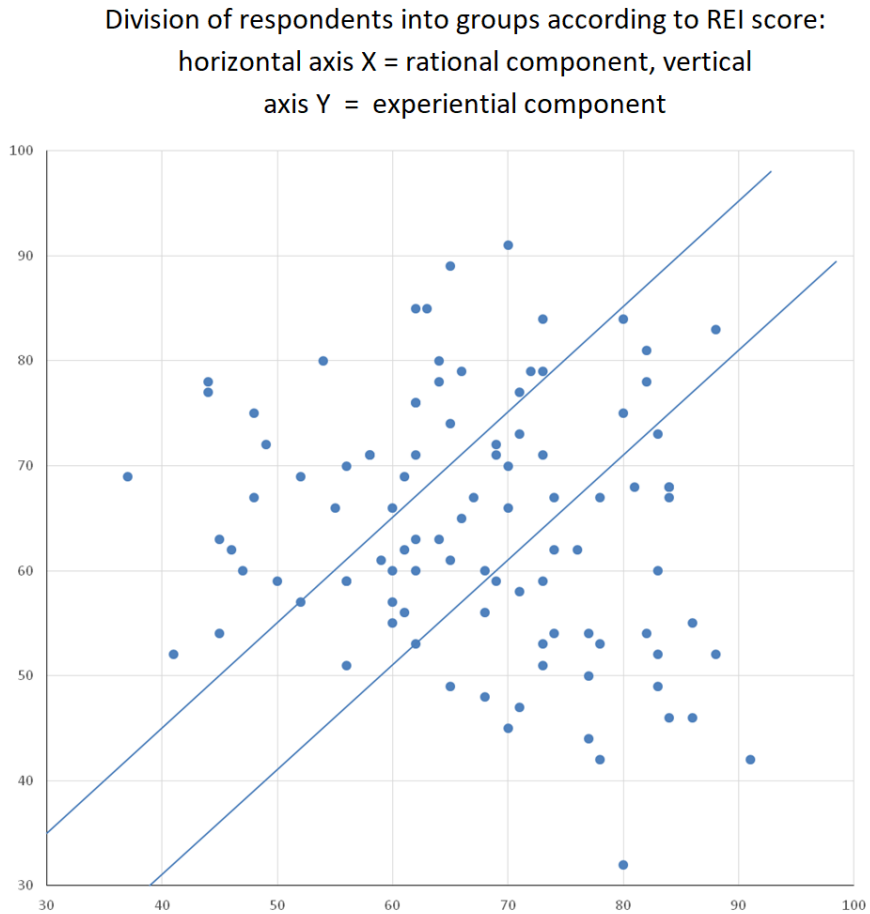

Figure 1: The parallel oblique lines symbolically indicate the division into groups; above the upper dividing line are the more experiential respondents, between the two dividing lines are the balanced respondents, and below the lower dividing line are the more rational respondents. The precise equations determining the position of the dividing lines are: upper dividing line: SumE = SumR + 5.5; lower dividing line: SumE = SumR – 9.5.

In the categorization of participants we depicted them one-dimensionally along a single axis, so as to mark individual differences of the rational and experiential score.[3] After acquiring the one-dimensional differential scale, we divided participants into thirds so that 31 respondents went into the balanced group (those with the least differences in the scores), 35 respondents were in the group of those predominantly rational or analytical, and again there were 35 in the group of those predominantly experiential or intuitive. The overall reliability of the REI questionnaire measured as Cronbach's alpha was 0.87 for the rational part and 0.86 for the experiential part, respectively, indicating a high consistency of the respondent's answers.

2.2 Materials and procedure

The conception of the research involved compiling and distributing two variants of equivalent and counterbalanced questionnaires (methodologically we took inspiration partly from Utsumi 2005). All participants completed five tasks in a fixed order. The tasks were: a production task, a metaphor task, a comprehensibility rating task, a literariness rating task and a REI task. Each participant filled in only one questionnaire, either questionnaire 1 or questionnaire 2. In the first questionnaire, 50 randomly selected participants assigned in a production task at least 2 meanings or features for both of the separate concepts which in the questionnaire 2 appeared as a target or source domain in the complete metaphor. These target and source domains of the full metaphor in the questionnaire 2 were processed in a metaphor task by another group of 51 randomly selected participants. All the participants completed both of these tasks (a production task + a metaphor task); just they performed the tasks in reverse transposition (the two questionnaires were counterbalanced). That is to say, when a participant X was assigned to the single word/concept "road" in questionnaire 1, that person did not see and could not assign the "road" metaphor in questionnaire 2; conversely, when a participant Y was assigned to the single word/concept "world" in questionnaire 2, that person did not see and could not employ the "world" metaphor in questionnaire1.

To be precise, the separate concepts from questionnaire 1 "road" and "something does not escape from someone" appear in questionnaire 2 in the metaphor "*The road beneath him bends, but it won't escape from him*". The separate concepts from questionnaire 2 "world" and "pulsating uneasily" appear in questionnaire 1 in the metaphor "*The world is pulsating uneasily.*" Each metaphor was presented alone without literary context. In the metaphor task, participants in both questionnaires again assigned, for both the target and source domains, at least two meanings/features which these domain words evoked in them within the frame of the given metaphor. In other words, meanings or features of the separate concepts were described by one participant X, while the meanings or features of the same words but situated in the full metaphor (full metaphor as the primary stimulus) were generated by another person Y. The counterbalanced questionnaires each contained four separate concepts and two metaphors. Below each metaphor its target and source were written. For instance, below the metaphor "*The world is pulsating uneasily*." a participant was asked: Give at least 2 meanings/features which the word "world" evokes within the frame of *the given metaphor*; and, Give at least 2 meanings/features which the phrase "pulsating uneasily" evokes within the frame of *the given metaphor*. Every participant generated

meanings of four separate concepts in a production task as well as four metaphorical domains in the metaphorical frame in a metaphor task.

In the comprehensibility rating task, the respondents assigned a value to metaphor denoting ease of interpretation, from 1 (not at all comprehensible) through 4 (not sure whether comprehensible) to 7 (easily comprehensible).

In the literariness rating task, the respondents assigned a value to metaphor denoting its literariness, from 1 (nonliterary) through 4 (not sure whether literary or nonliterary) to 7 (extremely literary). We did not want to determine the specific literary features of metaphor, but the consistency of the subjective readings. That is why participants were instructed that metaphor literariness means that it is novel, original and of some literary and imaginative quality (tasteful, pleasant, beautiful, interesting, dramatic, exciting, surprising, poetic and so on). Each scoring scale was explained to the participants.

The comprehensibility rating task investigated whether there were differences between the three rational-experiential groups of participants as to their personal opinion about the difficulty of comprehending or making sense of each metaphor. The literariness rating task examined whether there were differences between the three groups as to their personal opinion about the literary "level" of each metaphor. It was necessary to detect the consistency in perceiving and understanding the given metaphors between the more rational, balanced and more experiential group. If the groups showed considerable differences in how they rated a particular metaphor, their stimuli for processing the metaphor (the target and source) would not be normative. Having regard to this, there would be a problem of how to process the magnitudes of their generated items.

Novel, original literary metaphors, even decontextualized ones, are usually very complex. If they are reduced, they undoubtedly lose some of their quality. Because of the above reasons, we preferred the complex metaphors in their original form.

Researchers mostly examine literary metaphors from English literature, but we decided to use the Slovak language and literature. Our metaphor material was chosen from František Švantner's extensive novel *Život bez konca* [*Life Without End*], written in 1947-1950. Švantner's work represents the pinnacle of the Slovak "lyrical prose" and has been appreciated for metaphorization of language, even poetic style. The selected metaphors are understandable in their immediate context. They depict themes that are common (e. g., people, world, road, life) and have the same target-source structure. Their comprehensibility/difficulty, as well as literariness, were rated by the participants. At the level of individual metaphors the measures were nearly equal for the groups of more rational, balanced, and more experiential participants, as subjective ratings by the participants show (see Appendix). In general, the metaphors were rated as rather literary (4.2 – 4.9) and rather comprehensible (3.9 - 5.7). Even though the metaphors as a group demonstrate less agreement in judgments of their comprehensibility, this is not a significant problem: more important is the fact that the more rational, more experiential and balanced groups differ very little in ratings of individual metaphor ($p>0.05$).

The last, fifth task at the end of each test was to fill in the Rational-Experiential Inventory according to Pacini and Epstein (1999).

3. Results

We assessed each Rational-Experiential Inventory (REI) and divided respondents into three groups. According to our categorization principles, the first group, also called the more rational, or analytical group, consisted of people who were more rational and less experiential. The second group, named the balanced group, consisted of people without an inclination toward rationality or experientiality. Lastly, the third group, also called the more experiential, or intuitive group, included people who demonstrated lower rationality and higher experientiality.

As a next step, we processed the respondents' answers. We coded every reply in each production and metaphor task from each individual participant. Since each participant received his/her REI assessment, we knew which responses were produced by the more rational, more experiential or balanced participants. For each of the three groups we collected two lists of all the meanings/features given: one for the separate concepts, and a second, independent list for the metaphorical domains (see Fig. 2). Two lists for each of the three groups gave us a total of six lists.

Subsequently, for purposes of reliability and control, the answers were reviewed by both authors. The reviewers proceeded independently of each other according to Utsumi's (2005, 156-157) instructions in regarding connected expressions and phrases by respondents as the same meaning in cases where they fulfilled one of four criteria: (a) the given expressions were equivalent synonyms, for example "transparent" and "translucent"; (b) the dictionary definition of one word included the other word or phrase, for example "fraud" and "untruth"; (c) the words had the same verbal root, for example "love" and "loving"; (d) the words were distinguished only in degree, for example "warm" and "warmest". They used the dictionaries of the Ľudovít Štúr Institute of Linguistics *Krátky slovník slovenského jazyka* [*Shorter Dictionary of the Slovak Language*] and *Synonymický slovník slovenčiny* [*Dictionary of Slovak Synonyms*]. If two words or short phrases did not correspond to any of the four given criteria, they were entered in the list as distinct meanings. Interagreement for the distinct meanings assessed by two independent reviewers was 94%. Following elaboration of the lists, every distinct meaning which was acquired only from one respondent (once-off token) was eliminated.

Among the three designated REI groups we ascertained the given meanings in all tasks, specifically for questionnaire 1 and specifically for questionnaire 2. Then we examined the overlaps between questionnaires in interplaying tasks (e.g., the overlap between meanings generated for the word "road" in a production task in questionnaire 1 and a metaphor task in questionnaire 2). Next, we ascertained the residual emergent meanings (those which appeared in the metaphor task and were not presented as meanings of the separate concepts). For example, for the word "road" in a production task in questionnaire 1 respondent X wrote two meanings/features: 1. life, 2. direction. In questionnaire 2, for the target "road" in a metaphor task, respondent Y generated three meanings/features: 1. life, 2. indeterminate, 3. development. The Overlap includes one meaning "life"; the Emergent meanings are "indeterminate" and "development"; and the residual Available, but For Metaphor Unused Meaning is "direction". The Overlap contains more familiar meanings, common also for separate concepts, while emergent meanings are specific.

Subsequently we assigned the meanings from the list for the metaphorical domains of target and source to four *metaphorical* categories: (a) those presented only for the Target Domain; (b) presented only for the Source Domain; (c) Shared Meanings, if the given meanings appeared in the lists for both Target and Source Domain; (d) Emergent Meanings were those which did not appear in the lists of meanings either in the Target or Source Domains. Target, Source and Shared Meanings together form Overlap of the Separate and Metaphorical Meanings. The residual *non-metaphorical* category consists of Available, but For Metaphor Unused Meanings, which together with Overlap forms the category of non-metaphorical Separate Meanings.

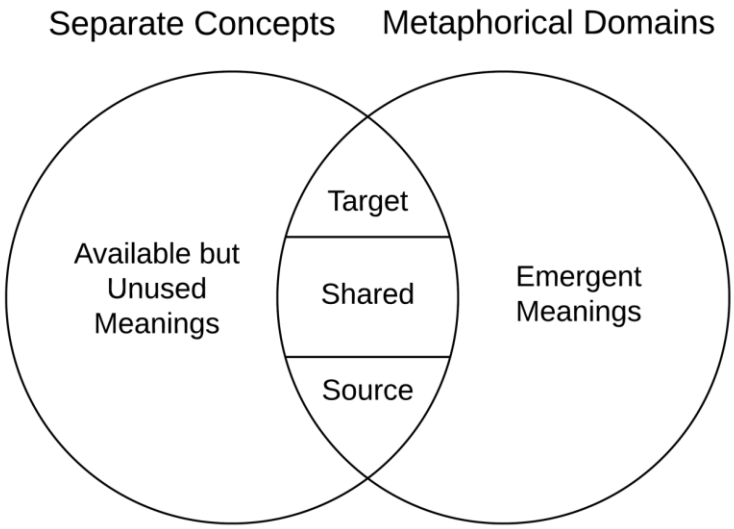

Figure 2: The figure illustrates Separate Concepts and Metaphor Meanings. It shows the category of Available, but For Metaphor Unused Meanings; the category of Target, Source, and Shared Meanings in Overlap between Separate Concepts and Metaphor Meanings; and the category of Emergent Meanings.

The number of meanings was measured by two counting methods: on the level of types and tokens. In the first instance each meaning is counted only once, and the number of people who present it is irrelevant; in the second it is counted as many times as the number of people presenting it. The difference between the counting methods is showcased in the following example: Let's assume a group consisting of two more Rational participants, R_1 and R_2, and a different group consisting of two more Experiential participants, E_1 and E_2. For a given metaphor, participant R_1 produces meaning M_1, while participant R_2 produces a different meaning M_2. However, let's assume that Experiential participants are more productive – both, E_1 and E_2, produce both meanings, M_1 and M_2, at the same time independently of each other. In the result, despite the difference between the productivity of more Rational and more Experiential participants in this example, the total numbers of types are the same for both groups: 2 ($1M_1$ + $1M_2$). However, the individual differences in productivity are clearly demonstrated on the level of tokens, where more Experiential participants produced in total 4 tokens whereas more Rational participants produced only 2 tokens.

3.1 Statistical testing

We performed statistical analyses of the data. Given their nature, types can be statistically tested only at the level of whole groups. On the other hand, statistical analyses of tokens can be performed both on the level of whole groups and on the level of individual participants, making this analysis more sensitive. In the tests, the first attribute was the predominant rationality, experientiality or balance of respondents; the second was the given numbers of source and target metaphorical meanings in terms of the categories of Target, Source, Shared Meanings, Overlap, Emergent Meanings, and the non-metaphorical category of Separate Meanings (Available but Unused Meanings + Overlap). In the case of Pearson's chi-squared test, the Overlap category was omitted to avoid multiple counts which would violate the test's assumption. The results of the test were evaluated on the level of meaningfulness $\alpha = 0.05$ (5%).

The structuring and correlating method is based on comparing the separate and metaphorical categorial sets specifically for each of the three distinct REI groups of respondents. In this phase of the evaluation of data we were interested in the numbers of meanings which participants had presented in the relevant categories for all metaphors, and whether there are statistical differences between the groups. From a cognitive standpoint it is important not only how many emergent meanings participants generate, but also how many meanings a distinct group produces for the separate concepts, and what correlations there are between the separate and emergent categories.

To test the influence of participants' rationality and experientiality on the perception and solution of metaphor, we tested the total number of Metaphorical and Separate meanings using an omnibus Pearson's chi-squared test. On the level of types, we did not observe a significant statistical difference between the REI groups: X^2 (2, 519) =1.9, p = 0.38). However, on the level of tokens, a Pearson's chi-squared test indicated differences in the processing of metaphor among the more rational, balanced and more experiential groups: X^2 (2, 1353) = 10.4, p = 0.005). Cramer's V was in both cases relatively low (0.06 and 0.08 respectively) indicating small effect size. Next, we analyzed only the Metaphorical (Target, Source, Shared and Emergent) meanings. On the level of types, once again, no significant statistical difference was observed: X^2 (6, 326) = 5.2, p = 0.51), while, on the level of tokens, a Pearson's chi-squared test once again indicated differences in the interpretation of metaphor among the REI groups: X^2 (6, 629) = 13.1, p = 0.04). Since we had not observed statistically significant differences on the level of types, we chose to focus the remainder of the analysis on tokens, which are more sensitive.

As a follow-up, we set off to identify the actual categories of meanings causing the differences among the groups (Table 1). Use was made of the pairwise Mann-Whitney Test, which makes it possible to test the degree of statistical independence of the selected variables in the given quantity of samples. The zero hypothesis H0 was that the distribution of numbers in the monitored categories does not depend on the predominating rationality or experientiality of respondents; the alternative hypothesis H1 is that it does so. The predominating rationality does not only mean rationality without experientiality, therefore we use the category of analytical (A) participants. Predominating experientiality does not only mean experientiality without rationality, so we present the category of intuitive (I) participants.

Table 1: The table presents mean numbers and percentage of tokens from the three groups of the more rational/analytical (A), balanced (B) and more experiential/intuitive (I) for the six categories involved in the interpretation of metaphor using Mann-Whitney test.

Group	Mode of evaluation	Category					
		Separate	Target	Source	Shared	Overlap	Emergent
Analytical	Mean number	12.0	2.9	1.4	0.1	4.4	1.8
	SD	4.09	1.70	1.22	0.24	2.16	1.44
	Percentage [%]	86.96	21.01	10.14	0.72	31.88	13.04
Balanced	Mean number	10.8	2.7	1.1	0.0	3.8	2.8
	SD	3.18	1.62	1.08	0.00	1.94	1.43
	Percentage [%]	79.41	19.85	8.09	0.00	27.94	20.59
Intuitive	Mean number	10.2	2.2	1.2	0.0	3.4	2.5
	SD	2.95	1.46	1.23	0.17	1.87	1.46
	Percentage [%]	80.31	17.32	9.45	0.00	26.77	19.69

The Mann-Whitney Test gave a *p*-value below 5% in the comparisons of the analytical vs. intuitive group for target domains, emergent meanings, overlaps, and moderately above conventional level of significance for separate concepts (Table 2).

Table 2: The table presents p-values on the basis of the numbers given in Table 1, Mann-Whitney Test. N = undefined; the given values cannot be calculated.

Compared groups	Category					
	Separate	Target	Source	Shared	Overlap	Emergent
A vs. I	0.094	0.043	0.45	0.99	0.04	0.042
A vs. B	0.34	0.52	0.33	N	0.23	0.009
I vs. B	0.47	0.16	0.84	N	0.4	0.55

3.2 Interpretation

One may argue that the findings of the research support H1. This means that on the level of tokens it was possible to distinguish predominantly rational (analytical) from predominantly experiential (intuitive) participants, insofar as concerns the production of emergent meanings in metaphoric thinking.

4. Analysis and discussion

In separate concepts the predominantly rational/analytic group delivered a mean number of 12 tokens per individual, while the predominantly experiential/intuitive group produced 10.2 tokens per individual (p =.094). Even p is above.05, this ratio is noteworthy. The deficit of almost one-sixth to the disadvantage of the intuitive group, suggests that the mental lexicon of persons in the defined analytical, intuitive and balanced groups maybe has an unequal conceptual content and structure. The predominantly

rational respondents contributed also a non-negligibly greater number of separate meanings on the level of tokens than did group of the balanced, among whom the mean per individual was 10.8 tokens.

Similarly, in the Overlap category (comprising the variables Target, Source and Shared Meanings) the analytical group predominates (mean 4.4 tokens for the analytical group (A), compared to 3.4 for the intuitive group (I); p =.04) and this is repeated in the Target category (A = 2.9 tokens; I = 2.2 tokens; p =.043).

Despite this prevalence of the analytical respondents, however, the mean numbers of meanings/features in the category of Emergent Meanings are reversed. The analytical participants reduce their production and the intuitive participants come to the forefront. The intuitive group provided 2.5 meanings on the level of tokens, while the analytical group produced the mean number of 1.8 tokens (p =.042). One must also stress the fact that in emergent meanings the most successful were the balanced participants (B), with a mean number of 2.8 tokens (B = 2.8 tokens vs. A = 1.8 tokens; p =.009).

That is to say, the analytical respondents are most productive only when they exploit their possible advantage of having more effective mechanisms to use the lexicon, prepared concepts (schematized in contexts, scenarios, scenes) for further verbalization. Lee (2005) argues that in social dialogue the rational participants, as compared with less rational participants, have more appreciation of real information and less trust in "placebos", do better at distinguishing the informative value of statements and make more thoughtful and selective responses to proposals. We may speculate that the more rational participants as compared to intuitive participants are also better in the pairing of target and source domains, which is manifested by their superior performance in the Overlap and Target domains.

To elaborate the argument, we refer to the research of non-literary metaphors by Cambell and Raney (2016). The participants firstly were given an English vocabulary test and asked to select the best meaning, from among five alternatives, for a given single word. These persons were then divided into low- and high-vocabulary knowledge groups. The two groups rated standard metaphor dimensions, among them comprehensibility, and they were also asked to think of different interpretations. For the high-vocabulary group the average rating for the comprehensibility dimension was slightly higher than for the low-vocabulary group. In our research findings the metaphors were considered to be slightly easier to comprehend by the analytical participants (see Appendix). As already indicated, we suppose that the analytical participants better use their mental lexicon. On the other hand, in Campbell and Raney (334) the low-vocabulary group thought on average slightly more alternative interpretations for the metaphors than the high-vocabulary group. Accordingly, the results of our research indicate that the more experiential participants elicit more emergent meanings than the more rational participants. Comparison is speculative, but the complementarities are interesting and warrant further study.

A difference between the rational cognitive style and the experiential cognitive style indicates the greater disposition of intuitive respondents to create emergent meanings during the processing of literary metaphor. Probably, their mapping of target and source on the level of a complex metaphor conceptualization is not as tight, or "economical", as the mapping of the more rational respondents.

Certainly, the above-mentioned findings do not say anything more precisely about the correctness of understanding of the metaphors by participants in the monitored groups of the more rational, the more experiential, and the balanced. They testify only to the higher potential of intuitive respondents to create new features for the given metaphors. Some meanings given by intuitive respondents might be marginal or inappropriate. However, the method used to collect meanings partially prevented irrelevant notions by excluding tokens entered only once.

At the same time, one cannot ignore the fact that the analytical respondents are dominant in the Overlap and Target domains. This indicates their more focused and more systematically ordered projections in mental spaces, or in other words their more economical and direct mapping of the Target and Source domains. Whether this mapping is also more precise, in terms of the correct solution of metaphors, is a question for further research of the rational and experiential cognitive style in metaphor processing. Kuzmíková (2018) indicated greater success by more rational participants in solving metaphors. Our current research points to a higher emergence, perhaps also a freer creativity of intuitive people in their interpretations of metaphor.

It is a matter for discussion whether the literary metaphors, which we took from František Švantner's novel *Život bez konca* [*Life Without End*], should not have been presented in their literary context. We used single-sentence metaphors without context, because this research did not seek to examine the correctness of the interpretation of metaphor, for which context gives more precise orientation. The subject of research was metaphorical mapping, metaphorical categories, and the emergence of metaphor in the rational and experiential systems of processing information, and for those research purposes the coherence of an interpretation is sufficient, irrespective of its correctness.

As regards the results, our findings do not entirely correspond with those which presented Emergent Meanings as the most numerous category, followed by the category of Target Domain (see Utsumi 2005, 158). In our research the predominant category is Target Domain, followed by Emergent Meanings. The difference may derive from our sample of participants, comprising three roughly equal groups categorized by their thinking preferences.

We found differences between the analytical and intuitive groups which may have an impact on the data acquired in experiments with metaphor. The balanced respondents are mostly situated between the analytical group and the intuitive group as to the numbers of features in metaphorical categories, but in the creation of Emergent Meanings they are in the leading position.

5. Directions for future research

This research opens up perspectives for a possible exploration of metaphoric thinking. One important consideration is that besides the Rational-Experiential Inventory-40, a vocabulary test may be included to discover relations between the mental lexicon of the participants and their solving of literary metaphor.

Another promising option is to measure the correctness of the interpretations of metaphors from the individual-differences approach. Thus expanded, the research should also consider the processing of

metaphors in their literary context. It is remarkable that a few of the analytical participants of the current research demanded the context of the given metaphors, but none of the intuitive participants did so.

The current study calls for further research projects which follow on from its findings and will thus hopefully contribute to the empirical research of metaphor and development of the theory of metaphor.

فهم الاستعارات الأدبيّة في الأساليب المعرفيّة العقلانيّة والتجريبيّة للتفكير البشري

جانا كوزميكوفا
قسم تاريخ الأدب السلوفاكي بمعهد الأدب السلوفاكي، الأكاديمية السلوفاكية للعلوم، سلوفاكيا

جان كوزميك
قسم الاحياء الخلوية، جامعة تشارلز، جمهورية التشيك

الملخص

ركزت الأبحاث السابقة التي تتناول تفسير الاستعارات الشعريّة على وصف بنية الاستعارة وتحديد قواعدها عن طريق ملاحظة الخصائص الدلاليّة للاستعارة. وسلطت الدراسات الأدبيّة المعرفيّة الضوء على نهج تجريبي لتناول التفكير الاستعاري، ويدرس هذا النهج التجريبي العمليات التجريبيّة لتفسير الاستعارة وفهمها، من بين أمور أخرى. وتعدّ المعاني البارزة أمرًا أساسيًا تتسنى من خلاله معالجة الاستعارات، ولدينا بالفعل العديد من التقارير والنتائج والبيانات المعياريّة حول معالجة الاستعارات، ولكنّ الآليات المعرفيّة الفرديّة والاختلافات بين الأشخاص لم تحظَ باهتمام كافٍ. لمعالجة هذه المشكلة، وتتناول هذه الدراسة التجريبيّة تأثير الأساليب المعرفيّة العقلانيّة (التحليليّة) والتجريبيّة (الحدسيّة) في فهم الاستعارة الأدبيّة الشعريّة، وفي تحليلنا الإحصائي، استعنّا بطريقة التجميع الكسري في حساب إحصائيات المشاركين. وهي تسلط الضوء على عمليات الاستعارة غير المتطابقة في التفضيلات المعرفيّة العقلانيّة والتجريبيّة. ووفقًا للنتائج التي توصلنا إليها، فإنّ الأشخاص الذين يفضلون الأسلوب المعرفي التجريبي ينتجون معاني مجازية أكثر بروزًا نسبيًا من الأشخاص الذين يفضلون الأسلوب المعرفي العقلاني. وتسهم هذه النتائج في معرفة أعمق لنتائج التفكير الاستعاري.

الكلمات المفتاحية: الاستعارة الأدبية؛ تفسير الاستعارة. الأسلوب المعرفي العقلاني (التحليلي)؛ الأسلوب المعرفي التجريبي (البديهي)؛ المعنى المجازي الناشئ.

Acknowledgment

This work was supported by VEGA 2/0038/23.

We would also like to thank two anonymous reviewers for their comments and suggestions.

Endnotes

[1] Target and source are terms used in the conceptual metaphor theory; target refers to tenor and source refers to vehicle.

[2] We did not focus on the equal representation of genders, because our intention was to study rationality and experientiality in metaphoric thinking in general. Kuzmíková (2018) detected more rational as well as more experiential individuals in an exclusively female sample. Therefore, we wanted to capture a more diverse sample of the population, where the gender, age or employment were not the deciding factors.

[3] This technique is designated as binning. Specifically we employed "equal frequency binning".

References

Bambini, Valentina, Paolo Canal, Donatella Resta, and Mirko Grimaldi. 2019. Time Course and Neurophysiological Underpinnings of Metaphor in Literary Context. *Discourse Processes* 56: 77–97.CrossRef Google Scholar

Becker, Angela H. 1997. Emergent and Common Features Influence Metaphor Interpretation. *Metaphor and Symbol* 12: 243-59.

Black, Max. 1962. "Metaphor". In *Models and metaphors*, ed. Max Black, 25-47. Ithaca, NY: Cornell University Press.

Blank, Glenn D. 1988. Metaphors in the Lexicon. *Metaphor and Symbolic Activity* 3 (3): 21–36.

Boers, Frank. 2003. Applied Linguistics Perspectives on Cross-Cultural Variation in Conceptual Metaphor. *Metaphor and Symbol* 18 (4): 231-38.

Bowdle, Brian F., and Dedre Gentner. 2005. The Career of Metaphor. *Psychological Review* 112 (1): 193–216.

Campbell, Spencer J., and Gary E. Raney. 2016. A 25-Year Replication of Katz et al.'s (1988) Metaphor Norms. *Behavior Research Methods* 48 (1): 330-40.

Colston, Herbert L. 2005. "Social and Cultural Influences on Figurative and Indirect Language". In *Figurative language comprehension: Social and cultural influences*, ed. Herbert. L. Colston and Albert N. Katz, 99-130. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Cools, Eva, and Herman Van den Broeck. 2007. Development and Validation of the Cognitive Style Indicator. *Journal of Psychology: Interdisciplinary and Applied* 141 (4): 359-87.

Čavojová, Vladimíra, Eva Ballová Mikušková, and Róbert Hanák. 2013. "Preferencia k deliberácii: (Ne)istota úspechu v kognitívnych úlohách [Preference for Deliberation: Success in Cognitive Tasks]". In *Kognitivní věda a umělý život 2013,* ed. Jozef Kelemen, Ján Rybár, Igor Farkaš and

Martin Takáč, 53 – 57. Opava: Slezská univerzita. http://cogsci.fmph.uniba.sk/kuz 2013/zbornik.kuz 2013.pdf

Columbus, Georgie, Naveed A. Sheikh, Marilena Côté-Lecaldare, Katja Häuser, Shari R. Baum, and Debra Titone. 2014. Individual Differences in Executive Control Relate to Metaphor Processing: An Eye Movement Study of Sentence Reading. *Frontiers in Human Neuroscience* 8 (10): 57-69.

Fauconnier, Gilles. 2006. *Mappings in Thought and Language*. Cambridge: Cambridge University Press.

Fetterman, Adam K., Jessica L. Bair, Marc Werth, Florian Landkammer, and Michael D. Robinson. 2016. The Scope and Consequences of Metaphoric Thinking: Using Individual Differences in Metaphor Usage to Understand How Metaphor Functions. *Journal of Personality and Social Psychology* 110 (3): 458-76.

Field, Andy, and Graham Hole. 2003. *How to Design and Report Experiments*. London: Sage.

Gibbs, Raymond W. 2017. "The Embodied and Discourse Views of Metaphor: Why These Are Not So Different and Why They Can Be Brought Closer Together". *In Metaphor: Embodied cognition and discourse*, ed. Beate Hampe, 319 – 34. Cambridge: Cambridge University Press.

Gineste, Marie-Dominique, Bipin Indurkhya, and Veronique Scart. 2000. Emergence of Features in Metaphor Comprehension. *Metaphor and Symbol* 15 (3): 117–135.

Giora, Rachel. 2003. *On Our Mind: Salience, Context, and Figurative Language*. Oxford: Oxford University Press.

Glucksberg, Sam. 2003. The Psycholinguistics of Metaphor. *Trends in Cognitive Sciences* 7(2): 92-96.

Glucksberg, Sam. 2008. "How Metaphors Create Categories – Quickly". In *The Cambridge handbook of metaphor and thought*, ed. Raymond W. Gibbs, Jr., 67–83. New York: Cambridge University Press.

Horváth, Ivan. 2010. *Prózy* [Proses], ed. Jana Kuzmíková. Bratislava: Ústav slovenskej literatúry SAV.

Indurkhya, Bipin. 2006. Emergent Representations, Interaction Theory and the Cognitive Force of Metaphor. *New Ideas in Psychology* 24: 133-62.

Indurkhya, Bipin. 2007. "Creativity in Interpreting Poetic Metaphors". In *New directions in metaphor research*, ed. Takashi Kusumi, 483-501. Tokyo: Hitsuji Shobo.

Jakobson, Roman, and Morris Halle. 1956. "The Metaphoric and Metonymic Poles". In *Fundamentals of language*, 76–82. The Hague: Mouton and Co.

Kahneman, Daniel. 2011. *Thinking, Fast and Slow*. New York: Farrar, Straus & Giroux.

Katz, Albert N., Allan Paivio, Marc Marschark, and James M. Clark. 1988. Norms for 204 Literary and 260 Nonliterary Metaphors on 10 Psychological Dimensions. *Metaphor and Symbol* 3 (4): 191-214.

Kövecses, Zoltán. 2005. *Metaphor in Culture: Universality and Variation*. Cambridge: Cambridge University Press. [Crossref], [Google Scholar]

Kuzmíková, Jana. 2018. Metaphor in Theory and Research. *World Literature Studies* 10 (3): 30–46. https://www.ceeol.com/search/article-detail?id=707318

Lakoff, George, and Mark Johnson. 1980. *Metaphors We Live By*. Chicago: Chicago University Press.

Lakoff, George. 2008. "The Neural Theory of Metaphor". In *The Cambridge handbook of metaphor and thought*, ed. Raymond W. Gibbs Jr., 17-38. New York: Cambridge University Press.

Landau, Mark J., Brian P. Meier, and Lucas A. Keefer. 2010. A Metaphor-Enriched Social Cognition. *Psychological Bulletin* 136 (6): 1045-67.

Lee, Eun-Ju. 2005. When Placebic Information Differ from Real Information: Cognitive and Motivational Bases of Mindful Reactions to Informational Social Influence. *Communication Research* 32 (5): 615-45.

Nueckles, Matthias, and Dietmar Janetzko. 1997. "The Role of Semantic Similarity in the Comprehension of Metaphor". In *Proceedings of the nineteenth annual conference of the Cognitive Science Society*, 578-83. Stanford, CA: Lawrence Erlbaum Associates, Inc.

Ortony, Andrew. 1993. *Metaphor and Thought*. Cambridge: Cambridge University Press.

Pacini, Rosemary, and Seymour Epstein. 1999. The Relation of Rational and Experiential Information Processing Styles to Personality, Basic Beliefs, and the Ratio-Bias Phenomenon. *Journal of Personality and Social Psychology* 76 (6): 972–87.

Rai, Sunny, Shampa Chakraverty, Devendra K. Tayal, Divyanshu Sharma, and Ayush Garg. 2019. Understanding Metaphors Using Emotions. *New Generation Computing* 37: 5-27.

Richards, Ivor A. 1936. *The Philosophy of Rhetoric*. New York – London: Oxford University Press.

Ricoeur, Paul. 1977. *The Rule of Metaphor: Multi-Disciplinary Studies of the Creation of Meaning in Language.* Toronto: University of Toronto Press.

Semino, Elena. 2005. The Metaphorical Construction of Complex Domains: The Case of Speech Activity in English. *Metaphor and Symbol* 20(1): 35-70.

Semino, Elena. 2008. *Metaphor in Discourse*. Cambridge, New York: Cambridge University Press.

Sirota, Miroslav, Marie Juanchich, and York Hagmayer. 2014. Ecological Rationality or Nested Sets? Individual Differences in Cognitive Processing Predict Bayesian Reasoning. *Psychonomic Bulletin & Review* 21 (1): 198-204. doi.org/10.3758/s13423-013-0464-6

Stanovich, Keith E., and Richard F. West. 2000. Individual Differences in Reasoning: Implications for the Rationality Debate? *The Behavioral and Brain Sciences* 23: 645–726.

Steen, Gerard. 2015. Developing, Testing and Interpreting Deliberate Metaphor Theory. *Journal of Pragmatics* 90: 67–72.

Steen, Gerard. 2017. Deliberate Metaphor Theory: Basic Assumptions, Main Tenets, Urgent issues. *Intercultural Pragmatics* 14 (1): 1–24.

Steen, Gerard. J., and Raymond Gibbs. 2004. Questions About Metaphor in literatue. *European Journal of English Studies* 8: 337–54.

Švantner, František. 1974. *Život bez konca* [Life Without End]. Bratislava: Slovenský spisovateľ.

Turner, Mark. 1996. *The Literary Mind*. Oxford: Oxford University Press.

Utsumi, Akira. 2005. The Role of Feature Emergence in Metaphor Appreciation. *Metaphor and Symbol* 20 (3): 151-72.

Utsumi, Akira. 2011. Computational Exploration of Metaphor Comprehension Processes Using a Semantic Space Model. *Cognitive Science* 35: 251-96.

Zhong, Chen-Bo, Vanessa K. Bohns, and Francesca Gino. 2010. Good Lamps Are the Best Police: Darkness Increases Dishonesty and Self-Interested Behavior. *Psychological Science* 21: 311-14.

Vega-Moreno, Rosa E. 2004. Metaphor Interpretation and Emergence. *UCL Working Papers in Linguistics* 16: 297-322.

Witteman, Cilia, John Van den Bercken, Laurence Claes, and Antonio Godoy. 2009. Assessing rational and intuitive thinking styles. *European Journal of Psychological Assessment* 25 (1): 39-47.

Appendix

Literal translation of metaphors (M), their Slovak original, reduced syntactic form, and the mean number of comprehensibility and literariness ratings on a 7-point scale, ranging from 1 (not at all comprehensible or not at all literary) through 4 (not sure whether comprehensible or literary) to 7 (easily comprehensible or extremely literary) in the three groups of analytical A, balanced B, intuitive I:

Questionnaire Q1

M 1: [People are joining together in pure liquid.]

"*Ľudia sa spájajú pospolu v číru tekutinu.*" (noun – noun)

Comprehensibility: A = 4.4; B = 4.1; I = 4.3

Literariness: A = 4.2; B = 4.2; I = 4.9

M 2: [The world is pulsating uneasily.]

"*Svet nepokojne pulzuje.*" (noun – verb)

Comprehensibility: A = 5.7; B = 5.7; I = 5.1

Literariness: A = 4.2; B = 4.5; I = 4.3

Questionnaire Q2

M 3: [Blood is the measure of life.]

"*Krv je mierou života.*" (noun – noun)

Comprehensibility: A = 3.9; B = 3.9; I = 3.9

Literariness: A = 4.3; B = 4.8; I = 4.2

M 4: [The road beneath him bends, but it won't escape from him.]

"*Cesta sa pod ním ohýba, ale jemu neutečie.*" (noun – verb + verb)

Comprehensibility: A = 4.2; B = 4.3; I = 3.9

Literariness: A = 4.7; B = 4.3; I = 4.6