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Big-Five model of personality and word formation: role of open-mindedness in semantic transparency and economy of expression

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Abstract

As word formation can be conceptualized as an act of creativity with considerable space for differences among speakers, we present pilot research aimed at the examination of the role of Big-Five personality domains in the formation of new complex words. The sample consisted of 197 participants who underwent a word formation test and a personality assessment via The Next Big-Five Inventory. The results indicate that when ordinal regression is conducted with an aim of accounting for age and gender, open-mindedness is shown as a potentially important predictor – it positively predicted economy of expression and negatively predicted semantic transparency. Furthermore, a more nuanced approach differentiating three facets of open-mindedness shows that creative imagination predicted semantic transparency positively while esthetic sensitivity predicts semantic transparency negatively (the reverse is true for the economy of expression). These findings provide a promising starting point for future research.

Keywords: word formation; onomasiological approach; semantic transparency; economy of expression; Big-Five model; open-mindedness/openness to experience

Nothing will come of nothing.
(King Lear, Act 1, Scene 1)

1. Introduction

According to the onomasiological theory of word formation (Körtvélyessy & Štekauer, 2014; Körtvélyessy et al., 2015; Štekauer, 1998, 2005a, 2017; Štekauer et al., 2005), the process of word formation is not conceptualized as a blind process, but rather as an act of creativity with considerable space for differences among language speakers (Körtvélyessy et al., 2020, 2021, 2022; Štekauer et al., 2005).

Relatedly, it was suggested by Jauk (2019) that real-life creativity emerges from a deeper level of analysis – psychological constructs and even deeper level of underlying neurobiological systems.¹ When pondering the psychological level of analysis, two factors should be mentioned, namely, abilities and personality (Jauk, 2019). Since abilities, in terms of divergent thinking, have been covered in previous research (see, e.g., Körtvélyessy et al., 2020, 2021, 2022), the present research is focused on the role of personality in word formation within the framework of the onomasiological theory of word formation – an area of research that has not been explored yet. For this purpose, we employed one of the currently most influential personality models – the Big-Five model of personality.

Section 2 sets the scene by introducing fundamental characteristics of the Big-Five model as a theoretical basis for the psychological facet of our research (Section 2.1) as well as three cornerstones of the word formation aspect of the present research (Section 2.2): (1) an onomasiological theory of word formation, in particular, a system of onomasiological types (OT); (2) a theory of word formation as competition between semantic transparency and economy of expression; and (3) a theory of word formation creativity. Section 3 provides a general background and the fundamental principles of the present research. In particular, Section 3.1 accounts for the method of research, including the sample of respondents (Section 3.1.1) and the research instruments and design (Section 3.1.2). Section 4 summarizes the research results by means of correlation analysis and a more comprehensive regression analysis from the perspective of a domain-level analysis (Section 4.1), and a more specific facets level (Section 4.2). These results are discussed in Section 4.3. Section 5 summarizes the research findings.

2. Theoretical frameworks

2.1. *The role of personality*

It is widely accepted that “personality traits mediate the relationship between brain and creative thought and behavior” (Feist, 2019a, p. 356) and that “the essence of personality is the relative uniqueness of a person’s thought and behavior” (Feist, 2019b, p. 31). However, personality can be conceptualized in many ways. Among a variety of conceptualizations available in the psychological literature, the Big-Five model is one of the most prominent descriptive models used in research in recent decades (Feher & Vernon, 2021; McCrae & John, 1992).

The Big-Five model is based on the lexical hypothesis, stating that the most important personality dimensions are encoded in the language and, by implication, an analysis of the ways how people think and speak about individual differences can provide important information about them (John & Srivastava, 1999). Although a more comprehensive review is beyond the scope of the present study, it is important

¹In particular, Jauk (2019) maintains that the dopaminergic system, executive control network, and the default mode network are the basis for the psychological level of analysis that consequently translates to real-life creativity. Dopaminergic system is related to neurotransmitter dopamine and it is associated with exploration and novelty seeking. Executive network is related to analytic, controlled, and effortful processes; while default mode network is active in spontaneous thoughts and it is related to associative, automatic, and effortless processes.

to at least briefly outline the history of this concept (for a thorough overview, we refer the reader to other resources such as John & Srivastava, 1999).

Following earlier pioneering research conducted by authors such as Allport and Odbert (1936), and Cattell (1943, 1945), the five-factor structure started to emerge and was replicated in the research literature (see, e.g., Goldberg, 1990). Later, this five-factor structure became to be known as “Big-Five” and was used in personality assessment (e.g., Costa & McCrae, 1992). Although development progressed and the taxonomic structure has been further examined and advanced, for example, by the prototypical approach (John et al., 1991); five general traits capturing the broadest level of abstraction of personality proved to be a useful integrative template and started to dominate the personality research.

As indicated by the term itself, Big-Five consists of five general traits capturing the broadest level of abstraction of personality. These traits are OPENNESS TO EXPERIENCE (also labeled as open-mindedness, intellect, or imagination),² CONSCIENTIOUSNESS, AGREEABLENESS, EXTRAVERSION, and NEGATIVE EMOTIONALITY (labeled also as neuroticism or emotional stability).

In particular, open individuals prefer novelty and have a broad range of interests; conscientious individuals are organized, and task-focused; agreeable individuals are gracious and cooperative; extraverted individuals are sociable and assertive; and individuals with low emotional stability are prone to negative emotions (Soto & Jackson, 2013).

Although various approaches to assessing these five domains have been proposed (e.g., NEO-FFI or BFI inventory); recently, a new version of the Big-Five inventory was developed by Soto and John (2017) to integrate advances in both psychological assessments as well as personality structure. It represents an approach that is more comparative (etic) than culture-specific (emic) and allows the assessment of both – more general domain level, as well as more specific traits, called facets (Soto & John, 2017). BFI-2 provides some benefits over older conceptualizations³ and although proposed relatively recently, it has been adapted to and validated in various languages, providing good psychometric properties (see, e.g., Halama et al., 2020; Kohút et al., 2020). These are the main reasons why BFI-2 has been chosen as a personality measure in the present study.

Conceptually, among all five Big-Five personality traits, it is especially openness/open-mindedness and related facets that are of major interest with regard to word formation. There are two main ways in which open-mindedness, as a personality trait, could relate to real-life creativity according to Jauk (2019). First, it helps one to engage in creative activities. Second, it helps the acquisition of knowledge. Beyond that, deeper processual levels can be uncovered. For example, from the perspective of a twofold model proposed by Kleinmintz et al. (2019), openness is inherently related to the first phase of creative thoughts – the generation of ideas; in contrast to the

²Note that the term openness to experience is used more often than open-mindedness; however, we will use the term open-mindedness as suggested by Soto and John (2017) as it accents more individual’s mental rather than social life. In some situations, though, we will also mention openness if it is more in line with the literature that we cite.

³For example, Soto and John, the BFI-2 summarize that It brings “a robust hierarchical structure, minimizes the influence of acquiescent responding, and provides greater bandwidth, fidelity, and predictive power than the BFI, while still retaining the original measure’s conceptual focus, ease of understanding, and brevity” (2017, p. 139).

second phase – the evaluation of proposed ideas. The generation of ideas involves the grouping of associations in a novel way (see, e.g., Kleinmintz et al., 2019) and it has been shown that the semantic network of creative people is different in comparison to people that are creative to a lesser degree (Beaty et al., 2018; Kenett et al., 2018).

For example, although the Big-Five model provides a descriptive rather than an explanatory approach and a deeper level of analysis is reserved for future research; it is worth noting that Christensen et al. (2018) have documented that people with a higher level of openness to experience have a different organization of the semantic memory. In particular, in comparison to people with a lower level of openness, people with a higher level of this personality trait have a better organization of associations and their network is more flexible and more interconnected. Additionally, from the perspective of performance, their answers are more unique and more abundant.

As a first approximation, this could provide an emerging line of evidence connecting open-mindedness/openness to experience and word formation as understood by the onomasiological theory of word formation as discussed below. Importantly, though, besides a more general domain level, openness/open-mindedness can be further differentiated into components (see, e.g., Christensen et al., 2019) and these components can be related to variables of interest more differentially. In fact, as a variance of various behavior criteria predicted by facets was not predicted by more general domains in previous research, differentiating more narrow facets has been proposed as a much more detailed approach to personality assessment (see, e.g., Paunonen & Ashton, 2001).

For example, Kaufman et al. (2016) delineated two facets of openness, namely engagement in reasoning and abstract information and engagement in emotions and fantasy. They found out that these facets relate to different types of creative performance.

Thus, beyond the more general domain level, an examination of specific facets could serve as a promising avenue in the present context as it can provide a starting point for future studies. The BFI-2 (Soto & John, 2017) distinguishes three specific facets of open-mindedness, namely INTELLECTUAL CURIOSITY, CREATIVE IMAGINATION, and ESTHETIC SENSITIVITY. Intellectual curiosity represents intellectual, curious, and complex thinkers that are interested in abstract ideas and curiosity. Esthetic sensitivity reflects people that are fascinated and sensitive to beauty, art, and poetry. Creative imagination captures people that are ingenuine, inventive, original, and clever (Halama et al., 2020; Kwiatkowska et al., 2019).

From a different perspective, an insight into the role of a language user's skills and knowledge in creative potential and creative performance in word formation and word interpretation is obtained from the experiments by Körtvélyessy et al. (2020, 2021, 2022), Štekauer (2005b), and Štekauer et al. (2005). The basic idea underlying these experiments is that both word formation and word interpretation are acts of creativity in which a language user decides on the naming strategy/interpretation of a new complex word by selecting out of (usually) many options. This process is affected by a number of linguistic factors (productivity of the available word formation rules, their mutual competition, productivity constraints, a language user's linguistic knowledge, experiences, and preferences), extra-linguistic factors (general knowledge and experiences of a language user, education, profession, age and gender of the coiner, the intention with/purpose for which a complex word is coined, vogue trends in word formation) and, importantly, also psychological factors such as the creative potential. It has been demonstrated that, *inter alia*, there is a tendency for speakers

with university education to prefer to form semantically more transparent words, while lower educated speakers are more frequently driven by the principle of the economy of expression (Štekauer et al., 2005). This education-based difference has also been observed in the interpretation of complex words by Janovcová (2015) who examined the influence of cognitive abilities upon meaning predictability. Her data suggest certain differences between high-ability participants (high verbal and high nonverbal) and low-ability participants (low verbal and low nonverbal). The experiments with three-constituent compounds like *house-bird glass* implemented by Gleitman and Gleitman (1970) revealed “very large and consistent differences among respondents of differing educational background” (Gleitman & Gleitman, 1970, p. 117). In particular, it was observed that “[t]he less educated groups make more errors, and to a significant extent make different errors than the most-educated group” (Gleitman & Gleitman, 1970, p. 128). Štekauer’s (2005b) experiments with native and nonnative speakers of English suggest, among other things, that those readings of novel/potential complex words which express stable and habitual relationships and/or are based on prototypical features of the objects named show a higher meaning predictability (Štekauer, 2005b, pp. 246–251) and that semantic transparency, as well as productivity of an onomasiological type, has a boosting effect upon the predictability of such words. Körtvélyessy et al. (2020, 2021, 2022) report that, among other things, female speakers feature higher word formation as well as interpretation creativity compared to their male counterparts, but, at the same time, the creative performance in both word formation and word interpretation depends on many factors like age, task-specificity, and gender, and it varies for individual creativity indicators/subscores of the *Torrence Test of Creative Thinking*. Since the ideas outlined in the above-mentioned works represent the psycholinguistic framework of our present experiment Section 2.2 discusses its core principles.

2.2. Theory of word formation

This section presents fundamental theoretical principles underlying the word formation part of the research. They include

1. an onomasiological theory of word formation, in particular, the theory of onomasiological types,
2. a theory of word formation as competition between semantic transparency and economy of expression, and
3. a theory of word formation creativity.

2.2.1. Onomasiological theory of word formation

The present research into word formation creativity is based on an onomasiological theory of word formation. Since it has been discussed in detail elsewhere (Körtvélyessy & Štekauer, 2014; Körtvélyessy et al., 2015, 2020, 2021, 2022; Štekauer, 1998, 2017; Štekauer et al., 2005), we restrict our presentation to the very basic principles concerning that part of the theory that is immediately relevant to the present research, the system of ONOMASIOLOGICAL TYPES. Each of the nine onomasiological types identified in Körtvélyessy et al. (2022) captures a specific word formation strategy chosen by a language speaker. This strategy reflects a coiner’s creative decisions at two levels: (i) the cognitive level at which the coiner

decides on which semantic categories and in what combination will be employed to constitute a prototypically ternary onomasiological structure whose general representation is given in (1):

- (1) Determining mark – Determined mark – Base

and (ii) the morphematic level that represents the onomasiological structure. The creative aspect is inherent in each onomasiological type. It is manifested at both of these levels in the way a coiner of a new word builds up an onomasiological structure on the basis of a cognitive analysis of the class of objects to be named, and in the way (s)he assigns morphemes to its individual constituents. The point is that (a) not every semantic category of the onomasiological structure must be represented by a morpheme of a given language, and (b) there usually are several options for the representation of the individual semantic categories by morphemes. A nice example that illustrates different word formation strategies in naming the same class of objects is offered by several options for naming ‘a person who writes novels’. There are several options in terms of semantic transparency and economy of expression. The complex word *novel writer* contains morphemes for all three constituents of the onomasiological structure in (1): *novel* stands for the determining mark (Result), *write* for the determined mark (Action), and *-er* for the base (Agent). The complex word *novelist* does not express the determined mark, the word *writer* misses a morpheme for the determining mark, and the conversion-based option *write_N* represents both Action and Agent by a single morpheme and lacks a morpheme for the determining mark. These four options feature different degrees of semantic transparency and different degrees of economy. Evidently, *novel writer* is semantically most transparent but least economical, while *write* is the most economical solution. *Writer* is somewhere between the two extremes. It is economical, hence speaker/writer-friendly, and, at the same time, it is partly predictable thanks to the presence of the morpheme representing the Action. This onomasiological type usually produces complex words that are too general: *a writer* can write novels, poems, letters, articles, blogs, emails, and so on. Finally, *novelist* is more economical than *novel-writer* but its semantic transparency is much lower: due to the absence of a morpheme representing the semantic category Action (determined mark), the relation between *novel* and *-ist* may be interpreted in many different ways, for example, ‘a person who writes novels’, ‘a person who sells novels’, ‘a person who proofreads novels’, ‘a person who publishes novels’, ‘a person who loves to read novels’, ‘a person who steals novels’, and dozens of other potential interpretations.

The following is a brief summary of the system of onomasiological types. Wherever possible, the first illustrating example under each type is taken from our research:

Onomasiological Type 1

- (2) Object – Action – Agent
miracle believe er
 ‘a person who believes in miracles’
 Result – Action – Instrument
signal – generate – or
 ‘a device generating signals’

Onomasiological Type 2


- (3) Object – Action – Agent
 \emptyset *interrupt* *er*
 ‘a person who frequently interrupts other people when they are talking’
 Time – Action – Instrument
 \emptyset *stop* *watch*
 ‘a device for measuring the time of an action’


Onomasiological Type 3

- (4) Stative – State – Patient
clone \emptyset *ie*
 ‘a child of two clones’
 Result – Action – Instrument
power \emptyset *unit*
 ‘a device generating power’

Onomasiological Type 4



OT 4 is based on the ACTION-TO-SUBSTANCE recategorization, that is, verb > noun conversion. This type ranks among the most economical of all onomasiological types because a ternary structure is represented by a single morpheme.

- (5) Object – Action – Agent

 \emptyset *smilen* ‘a person whose smiling face is used for billboard advertisements’

- Object – Action – Agent

 \emptyset *cheat_N* ‘a person who cheats other people,’

Onomasiological Type 5

OT 5 employs the same principle as OT4, that is, joint representation of the base and the determined mark. However, unlike OT4, the determining constituent of the onomasiological structure is represented by a morpheme.

- (6) Object – Action – Agent

spider *search* ‘a person who searches for spiders’
- Object – Action – Agent

tourist *cheat* ‘a person who cheats tourists’

Onomasiological Type 6

OT 6 is another extremely economical OT. It stands for exocentric compounds in which neither the base nor the determined mark is expressed. The semantic transparency of this OT is low. To take the examples in (7), anything can be done with a spiderweb, and anything can have a red skin.

- (7) Object – Action – Agent
spiderweb Ø Ø
 ‘a person who explores spider webs’
 Quality – State – Patient
red skin Ø Ø
 ‘a person who has red skin’

Onomasiological Type 7

In OT7, the mark cannot be structured into the determining and the determined parts, which yields a binary onomasiological structure. Both base and mark are morphematically represented.

- Neg (8) Negation – Quality
un *happy*
 ‘not happy’

Onomasiological Type 8

In OT 8, the mark of a binary onomasiological structure is not expressed. It is typical of the SUBSTANCE-TO-ACTION recategorization, that is, noun > verb conversion.

- (9) Object – Action
 Ø *bridge*
 ‘to connect by a bridge’
 Manner – Action
 Ø *laze*
 ‘to spend time in a relaxed, lazy way’

Onomasiological Type 9

In OT9, both mark constituents are expressed with the meaning ‘a person whose face is smiling on a billboard’. This type develops OT6, which is restricted to the expression of the determining mark. In the following example, the two mark constituents swap their positions:

- (10) State – Location – Patient
smile *face* Ø
 ‘a person with a smile on their face’

2.2.2. Word formation as competition between semantic transparency and economy of expression

The notion of semantic transparency has been one of the key concepts in examining the mechanisms underlying the interpretation of complex words, mostly but not

exclusively of $N + N$ compounds. Therefore, it has been paid much attention in a wide range of works in recent decades. This topic was first, directly or indirectly, examined by morphologists. Let us mention Zimmer's (1971, 1972) discussion of various degrees of acceptability, appropriately classificatory relation between compound constituents, and classificatory relevance. Anshen and Aronoff (1981) and Aronoff (1976) discussed the relation between semantic transparency (coherence) and productivity. Levi (1974, 1975, 1978) came up with a much-criticized but, at the same time, widely used concept of *Recoverably Deletable Predicates* for complex nominals. Downing (1977) introduced experiments with context-free interpretations of novel compounds, discussed the preference for habitual to temporary/fortuitous relations in predicting the meaning of novel words, and demonstrated the futility of former attempts (Lees, 1960, 1970; Levi, 1974, 1975; Li, 1971) to reduce the possible meanings of primary compounds to several broadly defined semantic classes. She aptly assumed that numerous interpretations of novel compounds are reducible to this kind of general relationship "only with the loss of much of the semantic material considered by the subjects to be relevant or essential to the definitions" (1977, p. 826).

The effort of morphologists was later followed by extensive psycholinguistic research, for example, Acquaviva (2017), Bell and Schäfer (2013, 2016), Borgwaldt and Lüttenberg (2010), Bourque (2014), Dressler (2005), Frisson et al. (2008), Gagné and Shoben (1997), Gagné et al. (2016), Körtvélyessy et al. (2015, 2022), Libben (1998, 2010), Libben et al. (2003, 2020), Libben and Weber (2014), Pollatsek and Hyönä (2005), Rainer et al. (2014), Schäfer (2018), and Štekauer (2005b), to name at least a few of them. Given the objectives of this article, we will restrict our discussion to semantic transparency. This section does not discuss broader aspects of complex word formation and interpretation, such as compositionality, predictability, conceptual knowledge and experiences, generalized semantic (thematic) relations, and morphological families.

The most common comprehension of semantic transparency is bound to complex word constituents in terms of their contribution to the interpretation of a complex word (e.g., Borgwaldt & Lüttenberg, 2010; Gagné et al., 2016; Pollatsek & Hyönä, 2005; Schäfer, 2018). That means, a constituent is semantically transparent if it is used in its original meaning, or as expressed by Bell and Schäfer (2016, p. 157) "compound transparency is a function of the transparencies of the constituents." It is assumed that the relative modifier-head position of the transparent-opaque constituents may also affect the interpretation of complex words (Libben et al., 2003; Marelli & Luzzatti, 2012). While, for example, Cohen and Murphy (1984), Dressler (2005), Hampton (1987), and Libben (1998) emphasize the significance of the head constituent, the CARIN model (Gagné, 2001; Gagné & Shoben, 1997) attributes a crucial role to the modifier concept. Its elaborated version, the RICE model (Spalding et al., 2010), assigns higher significance to the modifier only in suggesting potential relations, while both the modifier and head are believed to be crucially involved in their evaluation. Tarasova (2013), too, assumes that both of them are important (even though with different roles) for the interpretation of compounds.

El-Bialy et al. (2013) distinguish between two major approaches to the role of the semantic transparency of complex word constituents. According to the *conjunctive activation approach*, such as Libben (1998) and Zwitserlood (1994), only semantically transparent constituents facilitate compound processing; opaque

constituents have no influence. Libben (1998), for example, distinguishes between constituency, which pertains to the use of compound constituents in their original/shifted meaning, and componentiality, which indicates whether the meaning of a compound as a whole can be inferred from the meanings of its constituents. This kind of consideration inspired Borgwaldt and Lüttenberg (2010) to define semantic transparency as the strength of the relationship between the meaning of the whole compound and the meaning of its constituents.

This is basically in line with the meta-model for morphological processing proposed by Schreuder and Baayen (1995) who assume that “a semantically transparent relation between a complex word and its constituents can be modeled as a substantial overlap between the set of (semantic) representations of the complex word and the sets of representations of its constituents” (Schreuder & Baayen, 1995, p. 140).

The other approach, the *meaning computation approach* (Gagné & Spalding, 2009; Ji et al., 2011), postulates the involvement of both transparent and opaque constituents in meaning interpretation: while the former facilitates it the latter hinders it.

Nevertheless, the meaning of complex words cannot be unambiguously computed from the meanings of the constituents: since all complex words are – compared to syntactic phrases – a sort of shortcut representations, binding the semantic transparency of complex words to that of their constituents does not tell us much about the semantic transparency of the complex word as a whole: the principle of compositionality does not apply to word formation. This is especially true of primary compounds, some types of affixed words without a verbal element, and converted words because they admit multiple potential interpretations even if their constituents are used in their ‘core meaning’. Therefore, an essential role in evaluating semantic transparency of complex words is also played by thematic relations between the complex word constituents (e.g., Bell & Schäfer, 2016; Gagné, 2001; Gagné & Shoben, 1997; Štekauer, 2005b).

In general, various accounts of semantic transparency disregard some crucial factors which should be reflected in any meaning prediction-oriented theory, such as the dependence of word interpretation on word formation, the influence of the tendency toward the economy of expression on semantic transparency, the relation between the conceptual and the morphematic structures of complex words, and the competition between various possible readings.

A specific feature of our approach to semantic transparency is that it is not restricted to the interpretation of compound words. It is based on the integrated onomasiological model of complex words (Körtvélyessy et al., 2022) that relates the interpretation act to the word formation act and accounts for the dependence of the former on the latter. Since the model applies to all complex words (not only to $N + N$ compounds or converted words), the same is true of the scope of semantic transparency. In addition, by relating semantic transparency to the act of word formation it is also related to economy of expression. These are two contradictory tendencies competing at each level of language. Their competition at the level of word formation predetermines the ease/difficulty of interpretation of a complex word. The competition is resolved by creative decisions of a coiner that are reflected in the selection of a particular (more transparent or more economical) onomasiological type for the naming of a specific class of objects. In particular, the semantic

transparency of a complex word is determined by creative decisions of a coiner of that word

1. at the level of onomasiological structure: what semantic categories are selected to represent the class of objects at the onomasiological level;
2. at the level of morphematic structure: which semantic categories of the onomasiological structure are selected for morphematic representation and which morphemes are selected for this purpose.

The above-mentioned onomasiological types, therefore, underlie complex words of different degrees of semantic transparency and economy of expression. This means that both semantic transparency and economy of expression can be represented as a scale (Figs. 1 and 2).⁴ The scalar nature of semantic transparency is generally admitted and is best reflected in various experiments in which respondents were asked to rate the degree of semantic transparency, interpretability, or meaning predictability of potential complex words (e.g., Coolen et al., 1991; Gagné, 2001; Gagné & Shoben, 1997; Körtvélyessy et al., 2022; Štekauer, 2005b). These scales reflect the crucial role of the cognitive category of ACTION bound to the determined mark of the onomasiological structure in the formation and interpretation of novel complex words. If this category is morphematically represented in a new word it contributes to the semantic transparency (to the detriment of the economy of expression) of the whole word because it relates the semantic categories of the onomasiological base and the determining mark, thus reducing the potential number of possible interpretations of a new complex word to a minimum in comparison to those coinages in which this semantic category is not represented by a morpheme.

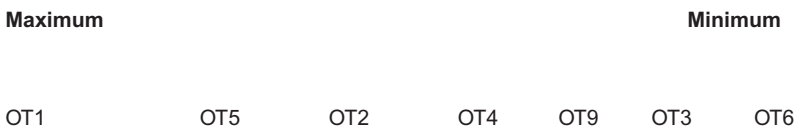


Fig. 1. A scale of the semantic transparency of onomasiological types.

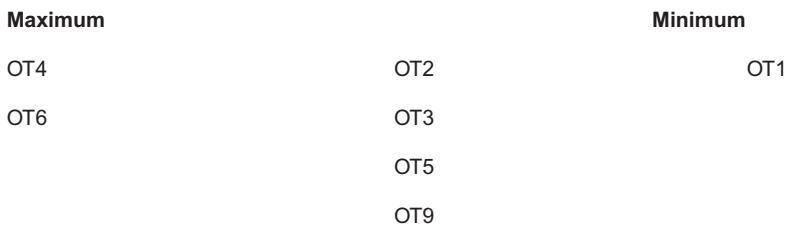


Fig. 2. A scale of the economy of expression of onomasiological types.

⁴Onomasiological types 7 and 8 are not included because they did not occur in the replies of our respondents.

A summary of the fundamental principles for the organization of the two above-mentioned scales are as follows:

1. The transparency of OT1 is the maximum possible because each semantic constituent of the ternary structure is morphemically represented.
2. OT2 is more transparent than OT3 thanks to the morphemic representation of the cognitive category of ACTION. The same is true of OT4.
3. OT5 is more transparent than OT4 because, apart from the base and the ACTION being merged, it is also represented by a morpheme standing for the determining mark.
4. OT2 is more transparent than OT4 because both the base and the ACTION are represented by morphemes.
5. OT5 is more transparent than OT2. Although its ACTION and base are represented by a common morpheme, in contrast to OT2, the determining mark is also represented by a morpheme.
6. OT9 is more transparent than OT3 because while it lacks a morpheme for the base, the ACTION and the determined mark are expressed.
7. OT9 is less transparent than OT4, which contains morphemes for the ACTION as well as for the base.
8. OT6 is the least transparent because it only contains the determining element of the mark.

It follows from the scalar nature of the two contradictory tendencies that a language user can employ various naming strategies in a particular naming act. A system of onomasiological types can, therefore, be advantageously employed not only for the examination of the influence of the creative potential upon the creative performance in word formation (and, consequently, in word interpretation) but also for the examination of the influence of a language user's personality upon these word formation processes. In the present research, we concentrate on the formation of complex words comprehended as a creative act of an individual language speaker in the sense specified above. The following section, therefore, accounts for our conception of word formation creativity.

2.2.3. *Theory of word formation creativity*

The creative aspect of word formation is a part of a broader issue of linguistic creativity that has been – since Chomsky (1964, 1965, 1966, 1976, 1980) – viewed in opposition to productivity (e.g., Bauer, 1983, 2001; Lieber, 2010; Schultink, 1961).⁵ Nevertheless, this strict opposition has aptly been called into question by authors who prefer to speak of a cline between creativity and productivity (e.g., Bauer, 2001; Hohenhaus, 2007; Ladányi, 2000; Mattiello, 2018; Munat, 2007).

Word formation creativity itself has mostly been discussed in the context of lexical creativity (e.g., Arndt-Lappe et al., 2018; Munat, 2007) and has commonly been restricted to nonrule governed, extra-grammatical, unpredictable coinages as opposed to productive, rule-governed and 'grammatical' formation of new words (e.g., Dressler & Brabaresi, 1994; Mattiello, 2018). Arnaud (2013, p. 98) relates it to inventiveness whose components are "unexpectedness, that is, the form-meaning

⁵Compare Körtvélyessy et al. (2022) for a discussion of various approaches to linguistic creativity.

relationship is indirect; astuteness, that is, a complex concept is named aptly; compactness (terseness, economy of means); playfulness, that is, the users detect humor in the formation; live metaphor and metonymy (esp. if far-fetched or colorful); need for an interpretive effort.” The ultimate goal of lexical creativity in this comprehension is predominantly to catch attention by breaking away from the norm (López Rúa, 2010, p. 51). By implication, creativity concerns “new, original, unprecedented, or unconventional products that depart from familiar, established, predefined, and fully predictable outcomes” (Langlotz 2015, p. 41). Such coinages require greater processing effort and therefore provide pleasure, amusement, and entertainment (Munat 2007, p. 179). As a result, they primarily serve humor, political correctness, playfulness, ludicity, figurative language (metaphor, metonymy, etc.), literary genres (e.g., poetry, narrative, and drama), puns, and wordplay.

An original approach to word formation creativity within an onomasiological theory was formulated as the CREATIVITY WITHIN PRODUCTIVITY CONSTRAINTS PRINCIPLE (Štekauer et al., 2005) which, rather than the rivalry of formal word formation rules, stresses the cognitive naming act performed by a particular language user who is aware of the available productive options of the word formation system of a given language. This principle thus emphasizes the formation of new complex words as an individual creative act based on the coiner’s reflection of the speech community’s need for a new word to label a yet not linguistically represented class of objects (in the broadest sense of the word) on the basis of its cognitive reflection. This means that each new word results from the interaction of a triad of factors: (i) a class of objects of extra-linguistic reality that is being named; (ii) a speech community with its need for a new word, represented by an individual language user, a coiner; and (iii) a word formation system of a given language. This approach lays emphasis on the (at first sight trivial but mostly disregarded) fact that the formation of a new word is not an automatic, blind process. Instead, a language user (coiner) manifests their creativity by selecting a naming strategy, in particular, by selecting from among several word formation processes and, within these processes, from among various rules of an unequal degree of productivity. Translated to the framework of the above-mentioned onomasiological theory, a coiner selects from a range of options available to them at the level of conceptual analysis, at the level of onomasiological structure, and at the level of its morphematic representation. In this way, the coiner selects from among all onomasiological types available for a given object of naming. By choosing a particular onomasiological type, the coiner also resolves the opposition between semantic transparency and economy of expression. This act of naming is affected by several factors (see Section 3). One of them is the productivity of onomasiological types/word formation rules which implies a preference for productive onomasiological types/rules. However, the creativity of language users is not restricted to the selection from among available productive and grammatical options. Creativity also refers to the coinages that serve primarily as attention-seeking devices, means of humor, playfulness, ludicity, puns, and wordplay. Such words apparently do not conform to any (obvious) linguistic rules and are not subject to any (obvious) constraints. Therefore, the above-mentioned principle was reformulated by Körtvélyessy et al. (2022) as *Creativity within and beyond Productivity Constraints* to encompass also those creative coinages that violate the constraints imposed by productive onomasiological types/word formation rules, that is, the cases of extra-grammatical word formation (e.g., Dressler, 2005; Dressler & Brabaresi, 1994; Mattiello, 2013).

Another crucial factor affecting the word formation strategy preferred by each language speaker and, therefore, each potential coiner is their *CREATIVE POTENTIAL*. As in any other activity of human beings, the creative potential underlies the language users' creative performance in forming new complex words as one of many domains of creativity in the use of language. Then, each naming act can be viewed as the cognitively founded creative performance of language speakers variously predetermined by the individual indicators of their *CREATIVE POTENTIAL* (i.e., Originality, Fluency, Flexibility, Elaboration, Creative Strengths, and Composite Score) and characterized by originality, novelty, uniqueness, usefulness, appropriateness, relevance, quality, and effectiveness as the basic features of creativity in general (e.g., Abraham, 2019; Kim et al., 2010; Simonton, 2012; Sternberg & Kaufman, 2010; Weiner, 2000). By implication, *CREATIVE PERFORMANCE* in the field of word formation results in new, hence original and unique words that are *APPROPRIATE* and *RELEVANT* signs of a class of objects to be named) as a result of the *DELIBERATE CREATIVITY* (cognitive activity) of language users; these signs are *USEFUL* and *EFFECTIVE* because they serve the communication purposes of a speech community, and since word formation creativity manifests the universal, biologically preconditioned feature of human beings (see, e.g., D'Agostino, 1984), every speaker of a language can produce a new word. Moreover, each new complex word meets the requirement that the result of creative performance should be "different, new, or innovative" (Kaufman & Sternberg, 2019, p. xiii) because each such new coinage is *DIFFERENT* from the existing words, which means, from the institutionalized vocabulary of a language and, by definition, it is *INNOVATIVE* with regard to the naming needs of a speech community. The criterion of *QUALITY* is guaranteed by the acceptance (institutionalization in Bauer's, 1983 sense) of a new complex word by a speech community for the designation of an object of extra-linguistic reality and its use for communication purposes. As a result, our approach obliterates a strict opposition between productivity and creativity because each new complex word is viewed as a result of one's creative performance of coining, irrespective of whether the resulting complex word is based on a productive or unproductive, grammatical or extra-grammatical process.

3. Present research

As suggested above, several factors predetermine the choice of a word formation strategy and, in more general lines, the approach of language users to the formation and interpretation of complex words. The most important factors include the coiner's age, education, gender, general knowledge, and experience (crucial to a cognitive analysis of the class of objects that determines the onomasiological structure of the new word) as well as the knowledge and experience with the use of a given language crucial to the way a language user represents an onomasiological structure by morphemes of a given language (see, e.g., Hrubovčák, 2016; Janovcová, 2015; Körtvélyessy & Štekauer, 2014; Körtvélyessy et al., 2015; Štekauer, 1998, 2005b). However, since the act of forming a new word is in its essence a creative performance of every individual coiner, this implies a considerable space for individual differences. Therefore, the present study is aimed at the examination of the role of personality in the process of word formation.

Our interdisciplinary research is based on the following principles: (i) at the linguistic level of analysis, participants underwent a word formation test; (ii) at the

psychological level of analysis, participants underwent the BFI-2 (Halama et al., 2020; Soto & John, 2017) aimed at assessing five general personality domains as well as more nuanced facets. Our research question is: Can the Big-Five domains predict the word formation creativity of individuals? We hypothesize that especially Open-mindedness, as a domain, can predict the word formation strategy (semantic transparency vs. economy of expression) in relation to the demographical information (gender and age of participants). Furthermore, since additional aspects of openness to experience can be differentiated (see, e.g., Christensen et al., 2019), we aim to examine also the role of three more specific facets – intellectual curiosity, esthetic sensitivity, and creative imagination as differentiated by the BFI-II (Halama et al., 2020; Soto & John, 2017), though this part is rather exploratory.

3.1. Method

3.1.1. Sample

The sample consisted of 197 university students (57% were females) with a mean age of 19.35 years (Median = 19; Mode = 19; $SD = 1.16$; 13 did not respond).

Respondents came from two universities in Košice. They were sampled based on their age and language skills. The group of university undergraduates was homogeneous with respect to their age and their level of English (B2/C1, according to the Common European Framework of Reference for Languages).

Testing was held within school hours/university seminars. The time reserved for the test was 30 minutes. Their participation was voluntary. The participants were allowed to end their participation at any time. No financial benefits were provided as compensation.

3.1.2. Instruments and design

For the assessment of the most general personality domains as well as more specific facets, the Next Big-Five Inventory (BFI-2) (Halama et al., 2020; Kohút et al., 2020; Soto & John, 2017) was used. Previous psychometric evaluation (Halama et al., 2020; Kohút et al., 2020; Soto & John, 2017) provides evidence for good reliability and validity of the questionnaire. The main advantage of the BFI-2 over other Big-Five inventories is that it minimizes the influence of the acquiescent response time by balancing the number of true and false-keyed items and that it covers both the facet level and the domain level (Soto & John, 2017). The BFI-2 covers five main domains. Every domain consists of three facets. Domains are represented by twelve items, every facet is represented by four items. Five-point scale from “Disagree strongly” to “Agree strongly” is used for rating the extent to which respondents agree or disagree with each item.

Word formation creativity was examined by means of a test that consists of three tasks each of which comprises three subtasks. Each task imposes different requirements upon respondents in accordance with the idea of task specificity (Baer, 2020; Baer & Kaufman, 2005). Task 1 is based on multiple choice. The respondents were offered a range of options for the naming of a person performing a particular activity or characterized by a particular quality. The options offered were aimed to cover as many onomasiological types and word formation types as possible. Task 2 does not offer any options. Instead, the respondents were asked to provide a name for an Agent or Patient merely based on a verbal description. Finally, Task 3 requires the same on

the basis of a drawing. The test design enabled the respondents to make use of productive patterns but also to come up with nonrule-governed (extra-grammatical) solutions. However, they were expressly asked not to use existing words or descriptive phrases. Any such proposal was eliminated from the evaluation. The word formation test is illustrated in Supplementary Appendix E.

For further analysis, the transparency and economy index is computed across all word formation tasks (general index). These indices represent an indication of the degree to which each respondent formed words concerning the economy of expression and the semantic transparency in each of the three word formation tasks.⁶ First, the level of semantic transparency and economy is evaluated as described in Section 2.2. Next, a new variable is created capturing the level of economy (maximum to minimum economy – OT4/6/10; OT2/3/5/9; OT1) and the level of transparency (maximum to minimum transparency – OT1; OT5; OT2; OT4; OT9; OT3; OT6/OT10). As such, the data are categorical. Using the mean (average) value is not recommended in this case. The median is used as a measure of the center in numerical data. Thus, instead of a score based on the mean, a score based on the median value is used to capture the tendency toward transparency or economy in the individual word formation tasks – the transparency and economy index. For preserving the ordinal character of the data, the resulting index was multiplied by a factor of two and for the ease of interpretation, the scores were inverted (so that a higher score represents a stronger rather than weaker tendency toward transparency or economy).

As we work with the ordinal dependent variable, statistical methods suitable for an analysis of ordinal data are used, namely Kendall's tau-b correlation and Ordinal logistic regression analysis (Field, 2017). Moreover, to account for multiple comparisons, Holm–Bonferroni correction has been implemented (Gaetano, 2018).

The analysis was conducted in a free and open statistical software jamovi (version 2.0) (The Jamovi Project, 2021).

4. Results

Descriptive statistics can be found in Supplementary Appendices A–D. Before the main analysis, zero-order correlations were computed with Holm–Bonferroni correction for multiple comparisons. General transparency, nor general economy indices were statistically significantly related to personality domains (all p -values > 0.05) and the effect sizes could be considered as very small ($r < 0.10$). In particular, zero-order correlations indicated that transparency was not significantly related to agreeableness ($r = 0.04$), conscientiousness ($r = 0.09$), negative emotionality ($r = 0.04$), extraversion ($r = 0.06$), or open-mindedness ($r = -0.01$); and economy was not related to agreeableness ($r = -0.01$), conscientiousness ($r = -0.06$), negative emotionality ($r = -0.07$), extraversion ($r = -0.04$), or open-mindedness ($r = 0.08$). The full correlation matrix can be found in Supplementary Appendix D. Due to potential nonmonotonic relationships, relationships have been also examined via Hoeffding's D correlation coefficient as a form of sensitivity analysis. As in the previous case, correlations were nonsignificant (all p -values > 0.05).

⁶Note that due to a more general level of analysis, we were not interested in indices for specific tasks in the manuscript, but this information can be found in the Supplementary Material.

However, as simple relations can be confounded by demographic variables related to age and gender (as shown in previous research) and we aimed to examine if personality accounts for word formation over and above demographics, we accounted for demographic via a more comprehensive regression model in the main analysis as described below.

4.1. Domain-level analysis

For the main analysis, ordinal hierarchical regression analysis was conducted.⁷ In the first block, we included the gender and age of participants. In the second block, five main Big-Five domains were included. This analysis was conducted for both general semantic transparency and economy of expression.

When predicting a general tendency toward semantic transparency, there was a significant improvement in fit over the null model (there was a statistically significant difference [$\chi^2(2) = 16.03, p < 0.001$] between this model and the intercept model) regarding the first model focused on demographic information (age + gender). This model accounted for 3% of variance in the criterion variable ($R^2_N = .03$; Deviance = 590.65; AIC = 614.65; BIC = 625.90). Similarly, there was a significant improvement in fit over the null when Big-Five domains were added in Model 2 ($\chi^2(7) = 24.97, p < 0.001$). The model accounted for 5% of the variance of semantic transparency ($R^2_N = .05$; Deviance = 581.715; AIC = 615.71; BIC = 669.90); however, the differences between the two models were not big enough to be shown to be statistically significant in the present sample ($\chi^2(5) = 8.94, p = 0.112$).

Gender ($p < 0.001$), open-mindedness/openness (vs. closed-mindedness) ($p = 0.021$), and extraversion (vs. introversion) ($p = 0.048$) have been shown to be statistically significant predictors of semantic transparency according to $\alpha = 0.05$ criterion. Open-mindedness was a negative predictor of semantic transparency. For every one-unit increase in open-mindedness, there is a predicted decrease of -0.55 in the log odds of providing a higher level of semantic transparency across all word formation tasks.⁸ Extraversion was a positive predictor of semantic transparency. For every unit of extraversion, there is a predicted increase of 0.49 in the log odds of having a higher level of semantic transparency in the word formation task. This indicates that participants scoring lower in open-mindedness and participants scoring higher in extraversion were more likely to provide more transparent responses. Age, agreeableness (vs. antagonism), conscientiousness (vs. lack of direction), and negative emotionality (vs. emotional stability) were not statistically significant predictors. However, these results should be interpreted with caution when multiple comparisons are considered, as only gender remains a significant predictor when Holm–Bonferroni correction is applied. More detailed information regarding predictors is shown in Table 1.

When predicting the economy of expression, there was a significant improvement in fit over the null model (there was a statistically significant difference [$\chi^2(2) = 11.29, p = 0.004$] between this model and the intercept model) regarding the first model working with demographics (age + gender). This model accounted for 5% of variance in the criterion variable ($R^2_N = .05$; Deviance = 321.55; AIC = 329.55; BIC = 342.30).

⁷The open data, analysis, and additional results can be found at: <https://osf.io/pq6fj/>.

⁸The results for all three word-formation tasks can be found in the Supplementary Material.

Table 1. Model coefficients for domain-level analysis considering the general semantic transparency

Predictor	Estimate	95% confidence interval		SE	Z	p	Odds ratio	95% confidence interval	
		Lower	Upper					Lower	Upper
Age	0.18	-0.08	0.45	0.13	1.35	0.178	1.20	0.92	1.57
Gender:									
Female–Male	1.23	0.61	1.86	0.32	3.85	< 0.001	3.42	1.84	6.45
Extraversion (vs. introversion)	0.49	0.01	0.98	0.25	1.98	0.048	1.63	1.01	2.65
Agreeableness (vs. antagonism)	-0.14	-0.69	0.41	0.28	-0.49	0.625	0.87	0.50	1.50
Conscientiousness (vs. lack of direction)	0.31	-0.19	0.81	0.25	1.21	0.228	1.36	0.83	2.24
Negative emotionality (vs. emotional stability)	0.13	-0.29	0.54	0.21	0.61	0.545	1.14	0.75	1.71
Open-mindedness (vs. closedness to experience)	-0.55	-1.03	-0.08	0.24	-2.28	0.023	0.58	0.36	0.92

Similarly, there was a significant improvement in fit over the null when Big-Five domains were added (Model 2) ($\chi^2(7) = 22.44, p = 0.002$). The model accounted for 5% of the variance of semantic transparency ($R^2_N = 0.09$; Deviance = 310.40; AIC = 328.40; BIC = 357.09) and the difference in predictive power between the two models was statistically significant ($\chi^2(5) = 11.14, p = 0.049$).

Similarly as in the previous case, gender ($p < 0.001$) and open-mindedness (vs. closedness to experience) ($p = 0.005$) have been shown to be statistically significant predictors of the economy of expressions. Openness was a positive predictor. For every one-unit increase in openness, there is a predicted increase of 0.76 in the log odds of providing a higher level of the economy of expression across all three word formation tasks. This indicates that participants scoring higher in openness were more likely to provide more economic expressions. Age, agreeableness (vs. antagonism), conscientiousness (vs. lack of direction), and negative emotionality (vs. emotional stability) were not statistically significant predictors. When Holm–Bonferroni correction is applied, both gender and open-mindedness remain statistically significant predictors. More detailed information regarding predictors is shown in Table 2.

4.2. Facets-level analysis of open-mindedness as a predictor

As open-mindedness has been shown to be a potentially important predictor on the domain-level of analysis, we also examined the facet-level analysis of this trait. Thus, similarly to the previous analysis, we included the gender and age of participants in the first block, however, instead of more general Big-Five domains, three facets of openness were included in the second block. As in the previous case, this analysis was conducted for both general semantic transparency and economy of expression across all three tasks.⁹

⁹Results for other facets can be found in the Supplementary Material.

Table 2. Model coefficients for domain-level analysis considering the general economy of expressions

Predictor	Estimate	95% confidence interval		SE	Z	p	Odds ratio	95% confidence interval	
		Lower	Upper					Lower	Upper
Age	-0.23	-0.54	0.06	0.15	-1.52	0.129	0.79	0.58	1.06
Gender:									
Female–Male	-1.20	-1.91	-0.52	0.35	-3.38	< 0.001	0.30	0.15	0.60
Extraversion (vs. introversion)	-0.47	-1.00	0.05	0.27	-1.75	0.080	0.63	0.37	1.05
Agreeableness (vs. antagonism)	0.27	-0.35	0.90	0.31	0.87	0.385	1.31	0.71	2.45
Conscientiousness (vs. lack of direction)	-0.36	-0.93	0.20	0.29	-1.25	0.213	0.70	0.39	1.22
Negative emotionality (vs. emotional stability)	-0.27	-0.74	0.19	0.24	-1.13	0.257	0.77	0.48	1.21
Openness (vs. closedness to experience)	0.76	0.24	1.30	0.27	2.81	0.005	2.14	1.27	3.68

When predicting a general tendency toward semantic transparency, there was a significant improvement in fit over the null when openness facets were added in Model 2 ($\chi^2(5) = 31.07, p < 0.001$). The model accounted for 5% of the variance of semantic transparency ($R^2_N = .05$; Deviance = 576.61; AIC = 605.42; BIC = 653.42). Crucially, the difference between the first model with age and gender only and the second model where three facets of open-mindedness were included was statistically significant ($\chi^2(3) = 15.04, p = 0.002$).

Gender ($p < 0.001$), creative imagination ($p = 0.005$), and esthetic sensitivity ($p = 0.005$) have been shown to be statistically significant predictors of semantic transparency. Esthetic sensitivity was a negative predictor of semantic transparency. For every one-unit increase in this facet, there is a predicted decrease of -0.49 in the log odds of providing a higher level of semantic transparency across all word formation tasks. Creative imagination was a positive predictor of semantic transparency. For every unit of extraversion, there is a predicted increase of 0.58 in the log odds of having a higher trend toward semantic transparency across word formation tasks. This indicates that participants scoring lower in esthetic sensitivity and participants scoring higher in creative imagination were more likely to have a tendency toward more transparent responses. Age and intellectual curiosity were not statistically significant predictors. When Holm–Bonferroni correction is applied, all three variables remain statistically significant predictors. More detailed information regarding predictors is shown in Table 3.

When predicting the tendency to the economy of expression, there was a significant improvement in fit over the null model when Big-Five facets were added (Model 2) ($\chi^2(5) = 26.84, p < 0.001$). The model accounted for 8% of the variance of semantic transparency ($R^2_N = 0.08$; Deviance = 306.00; AIC = 320.00; BIC = 342.31) and the difference in predictive power between the two models was statistically significant ($\chi^2(3) = 15.55, p = 0.001$).

As in the previous case, gender ($p < 0.001$), creative imagination ($p = 0.029$), and esthetic sensitivity ($p = 0.002$) have been shown to be statistically significant

Table 3. Model coefficients for facet-level analysis considering general semantic transparency

Predictor	Estimate	95% confidence interval		SE	Z	p	Odds ratio	95% confidence interval	
		Lower	Upper					Lower	Upper
Age	0.15	-0.11	0.42	0.13	1.10	0.273	1.16	0.89	1.52
Gender:									
Female–Male	1.44	0.85	2.06	0.31	4.69	< 0.001	4.23	2.33	7.82
Intellectual curiosity	-0.45	-0.93	0.02	0.24	-1.85	0.065	0.64	0.40	1.02
Esthetic sensitivity	-0.49	-0.84	-0.15	0.18	-2.78	0.005	0.61	0.43	0.86
Creative imagination	0.58	0.18	0.98	0.21	2.80	0.005	1.78	1.19	2.68

Table 4. Model coefficients for facet-level analysis considering the general economy of expressions

Predictor	Estimate	95% confidence interval		SE	Z	p	Odds ratio	95% confidence interval	
		Lower	Upper					Lower	Upper
Age	-0.18	-0.49	0.11	0.15	-1.19	0.235	0.83	0.61	1.12
Gender:									
Female–Male	-1.39	-2.10	-0.72	0.35	-3.97	< 0.001	0.25	0.12	0.49
Intellectual curiosity	0.44	-0.09	0.98	0.27	1.61	0.107	1.55	0.91	2.67
Creative imagination	-0.52	-1.00	-0.06	0.24	-2.19	0.029	0.59	0.37	0.94
Esthetic sensitivity	0.62	0.23	1.03	0.20	3.05	0.002	1.85	1.26	2.79

predictors of the economy of expression. Esthetic sensitivity was a positive predictor of the economy of expression. For every one-unit increase in this facet, there is a predicted increase of 0.62 in the log odds of providing a higher tendency toward the economy of expression across all word formation tasks. Creative imagination was a negative predictor of the economy of expression. For every unit of extraversion, there is a predicted decrease of -0.52 in the log odds of a higher tendency economy of expression in the word formation task. This indicates that participants scoring higher in Esthetic sensitivity and participants scoring lower in creative imagination were more likely to provide more transparent responses. Age and intellectual curiosity were not statistically significant predictors. When Holm–Bonferroni correction is applied, age and esthetic sensitivity remain statistically significant. More detailed information regarding predictors is shown in Table 4.

4.3. Discussion

The aim of the present study was to examine the role of the Big-Five personality dimensions – and especially openness/open-mindedness – in word formation. Our main theoretical framework was an onomasiological theory of word formation, conceptualizing word formation as a competition between semantic transparency and economy of expression where word formation is understood as a creative act (Körtvélyessy & Štekauer, 2014; Körtvélyessy et al., 2015, 2020, 2021, 2022; Štekauer, 1998, 2005a, 2017; Štekauer et al., 2005).

Based on the literature review, it was assumed that “personality traits mediate the relationship between brain and creative thought and behavior” (Feist, 2019a, p. 356) even when word formation, as an act of creativity, is considered. As a potential predictor of semantic transparency and economy of expression, we have chosen one of the most influential personality descriptive models, the Big-Five model of personality. In particular, a new version of the Big-Five Inventory (Halama et al., 2020; Kohút et al., 2020; Soto & John, 2017) was used, as it provides “valuable new opportunities for research examining the structure, assessment, development, and life outcomes of personality traits” (Soto & John, 2017, p. 139).

In the first step, we were interested if the Big-Five domains will predict word formation creativity. We expected especially the role of open-mindedness in word formation, as openness has been shown to be related to various forms of creativity in previous research. As indicated by the regression analysis, when gender and age are accounted for, open-mindedness was shown to be the only statistically significant predictor of semantic transparency and economy of expression. In particular, it has been found that gender predicts the general semantic transparency and economy of expression (females preferred a higher degree of semantic transparency); and when demographics are taken into account, the more open-minded participants are inclined to form a less transparent and more economical words.

Stated differently, if demographics are accounted for, higher open-mindedness of the language users is related to their preference for new words of the *spiderweb* type (i.e., with a logical Object, but without Action and Agent) over the words, such as *miracle believer* (where all three constituents of the onomasiological structure, are present, i.e., logical Object, Action, and Agent in this case). As summarized by Jauk (2019), openness (synonym for open-mindedness) as a personality trait, can not only help to engage in creative activities but also contributes to knowledge acquisition. Some authors also stress that it is related to the generation of ideas and grouping association in a novel way as contrasted to an evaluation of ideas (Kleinmuntz et al., 2019). Furthermore, it was documented that people higher in openness have a different organization of associations. Their semantic network is more flexible and interconnected (Christensen et al., 2018), although future research is necessary to explicitly establish the suggested mediating role.

Agreeableness (vs. antagonism), conscientiousness (vs. lack of direction), and negative emotionality (vs. emotional stability) were not statistically significant predictors. Extroversion (vs. introversion) was a statistically significant predictor of semantic transparency, but there is a high probability that this result is a false positive and occurred merely by chance.¹⁰ Therefore, we will not attempt to interpret it further, but we will at least mention the proposed role of the plasticity factor in creativity (Feist, 2019b). According to some authors, Big-Five traits can be further organized into broader factors of stability and plasticity (see, e.g., DeYoung, 2006; Digman, 1997; also De Raad et al., 2018 for examination of the distinction between Alpha/affiliation (communal) and Beta/Dynamism (agentic) factors in the different cultures; but see also Anusic et al., 2009 for criticisms of such approach).

According to Feist (2019b), it is especially the plasticity factor, encompassing both openness to experience and extraversion, that is related to creativity in various forms

¹⁰Note, however, that in larger studies that would be interested in detecting a smaller effect size of interest, there is some possibility that even this facet could emerge as statistically significant.

as indicated by emerging research in various areas (e.g., Costa et al., 2015; Feist, 2019b; Karwowski & Lebuda, 2016; Puryear et al., 2019). However, as we did not implement structural equation modeling, examining the higher-order structure is beyond the scope of the present study and it is, therefore, reserved for future investigations.

It is worth noting, though, that when pondering the results of the five personality domains in word formation, the percentage of the variance explained when all domains were included was not substantial and we did not have enough power to show that personality domains explain variance in word formation over and above the demographics. Moreover, results could be more nuanced when corrections for multiple comparisons are considered as the role of open-mindedness remained significant in the economy, but not in transparency when Holm–Bonferroni correction is applied. However, we will leave consideration of tradeoff between type I and type II errors up to reader as false negative results should be also considered, especially in the initial phases of research.

Besides more general domains, it was of importance to also examine the facet level as such endeavor could provide a more fine-grained approach as the level of facets has the “advantage of high fidelity: it provides a more precise description of behavior and can predict closely matched criteria with greater accuracy” (Soto & John, 2017, p. 118).

When three facets of open-mindedness were examined, they predicted a higher amount variance of criterion variables over and above demographics. When gender and age were accounted for, creative imagination predicted semantic transparency positively and economy of expression negatively. Furthermore, esthetic sensitivity predicted semantic transparency negatively and predicted the economy of expression positively. However, intellectual curiosity was not a statistically significant predictor given the present statistical power. As previously, it is worth mentioning that when Holm–Bonferroni correction is applied, the role of creative imagination in word economy could be questioned; but due to the risk of false negative results, we will leave consideration of tradeoff between type I and type II error up to reader similarly as in case of general domains.

Although the present results provide novel and potentially promising findings regarding the role of personality (and open-mindedness) in word formation, rather than definitive, they should be considered as a starting point for future research. Replication and further extensions are welcomed and recommended. Firstly, direct replication can provide robustness of the effect and some information regarding the role of potential moderators. Next, more conceptual replications and extension studies can further extend present results in meaningful ways (see, e.g., Crandall & Sherman, 2016; Hüffmeier et al., 2016).

The present study has some limitations that should be mentioned. First, the sample consisted of university students. Although the sample was chosen intentionally and we do not think that it limits the generalization, future studies should examine the role of personality in word formation with representative samples and focus on the role of possible moderators and potentially important variables worth accounting for beyond age and gender. Moreover, besides moderators, the role of potential mediators could be assessed in future research. For example, as Christensen et al. (2018) found that people with higher openness have a different organization of semantic memory that leads to a different organization of associations, it could be interesting to examine if present results are mediated by such processes. Second,

although we tried to implement a relatively conservative nonparametric analytic strategy (hierarchical ordinal regression), other approaches can be identified and could be even more appropriate in some contexts. For example, polytomous regression can be used in future research as some variables may be viewed as discontinuous and structural equation modeling could be used to decipher the role of plasticity vs. stability in word formation as suggested above. Relatedly, BFI-2 has various strengths (e.g., robust hierarchical structure; minimalization of the influence of acquiescent responding; greater bandwidth, fidelity, and predictive power than the previous version – for further discussion see Soto & John, 2017); however, alternative approaches can be identified (see, e.g., Anglim & O'Connor, 2019; Feher & Vernon, 2021) and considered as a productive template in future research. For example, comprehensive approaches to openness to experience can be used in future research to decipher the nuanced role of openness in word formation. For instance, Christensen et al. (2019) conducted a network analysis of various inventories related to openness to experience and found as many as 10 distinct facets and three higher-order aspects. Such classification could serve as a potentially fruitful approach for future research.

5. Conclusion

In conclusion, the present study provides preliminary evidence for the role of personality in word formation. In particular, it was found that besides gender, open-mindedness (also called openness to experience) predicts semantic transparency (negatively) and economy of expression (positively) if age and gender are accounted for. Furthermore, when the more general domain of open-mindedness is further differentiated into more specific facets, the role of two facets has been documented. In particular, creative imagination predicts economy of expression negatively while esthetic sensitivity predicts economy of expression positively. It has been also shown that creative imagination predicts semantic transparency positively and esthetic sensitivity predicts semantic transparency negatively. Although future research is necessary to replicate and extend present results, we hope that these findings will inspire future research into the role of personality, and other psychological factors in general, in word formation.

Supplementary material. To view supplementary materials for this article, please visit <http://doi.org/10.1017/langcog.2022.34>.

Conflicts of Interest. The authors declare that they have no conflict of interest.

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