Morphological and Evaluation Effect within Russian Syncretic Derivational Model

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Abstract

In the present study morphological and evaluation effect produced by visual presentation of morphologically complex words and pseudo-words was studied. In a lexical decision experiment Russian derivatives of a syncretic derivational type (combining nomination and evaluation in its motivational formula) were employed. The aim of the research was to reveal morphological effect in the derivatives of the syncretic model and to check the hypothesis about the semantic effect of evaluation being part of morphological processing. The results revealed a significant morphological effect in suffixed words and pseudo-words but questioned the hypothesis about the interaction of evaluation and morphological conditions in morphological processing.

Keywords: morphological effect; evaluation effect; language processing; derivational model; syncretic model

1. Introduction

Researchers have been interested in morphology since the early days of psycholinguistics. The question raised was related to the understanding of the mechanisms responsible for acquiring, storage and retrieval of the vocabulary in the mental lexicon and the role of morphology in these mechanisms (e.g., Taft & Forster, 1975; Forster, 1976; McClelland & Rumelhart, 1981; Butterworth, 1983). Since then, morphological properties have been studied with respect to their influence on word identification and morphological effects of different nature have been consistently reported in a number of studies: morphological frequency effects with high-frequency words or their parts (surface...
frequency and token frequency) facilitating word recognition (Burani & Caramazza, 1987; Cole, Beauvillain & Segui, 1989; Meunier & Segui, 1999; Ford, Davis & Marslen-Wilson 2010; Balota et al., 2004), morphological priming effect showing that prior exposure to a morphological relative makes the word identification faster and more accurate (Forster et al., 1987; Grainger et al., 1991; Marslen-Wilson et al., 1994; Feldman, 2000; Rueckl & Galantucci, 2005). Most studies on morphological processing cited here have been conducted in English though there has always been an interest to investigate the same problems in different languages. As a result, there has appeared a range of studies for a variety of languages: Dutch (Schreuder et al., 2003), French (Beauvillain, 1996; Cole et al., 1989; Meunier & Segui, 1999), Serbo-Croatian (Mirkovic et al. 2005), Finish (Pollatsek & Hyönä, 2005). Frost and Grainger (2005) encouraged data from other languages claiming: “…studies in other languages could produce converging or contrasting evidence that would allow the formulation of a more general theory of morphological processing; a theory that takes into account the specific characteristics of the orthography, phonology, and morphology of each language, and determines their implications for modeling the mental lexicon” (p.322). Though the evidence for the Russian language has not been presented in the latest empirical overview (Diependaele, Grainger and Sandra, 2012) and in an analytical review (Amenta & Crepaldi, 2012), the role of morphology in the organization of the mental lexicon based on the Russian language is being discussed in the works by Zalevskaya (1990) where the author treats a morpheme as a psycholinguistic unit helping to process lexical information. Sazonova (2000) also regards morphological component of a word as a motivational element in the identification process of a new word. Morphologically ambiguous forms in the Russian language are described in works by Ming Xiang et al. (2011) and Sloussar et al. (2013) studying how morphologically ambiguous forms are processed and influence the processing of other words in Russian.

Despite an overwhelming interest to morphological processing several aspects are still left under heated discussion, including the route of the processing and the role of semantic aspect in this processing. One set of proposals addresses the question of whether there is decomposition of morphological structure in lexical access (see Sandre, 1994), the other question – whether complex forms are accessed as whole words (e.g., Butterworth, 1983), or if there is a competition between these two access modes (Tafl & Forster, 1975; Schreuder & Baayen, 1995). As for semantics and its role in early processing stages researchers are concerned about the interplay of semantics and morphological structure. Thus, Feldman et al. (2012) examined contribution of semantics to morphological facilitation with Serbian materials and revealed that semantically similar primes produced greater facilitation than similar but semantically dissimilar primes when Serbian words appeared in the forward masked primed lexical decision task which suggested that even early in the course of processing, morphemes are units of meaning as well as of form. Semantic integration during the processing of French morphologically complex items was studied in Meunier et. al (2007) who claimed that priming only occurs with those morphologically complex pseudo-words which are interpretable (including those which are synonymous with a pre-existing derived form), providing evidence that semantic factors are taken into account when the prime is overtly presented. Morphological, semantic and orthographic relatedness in early visual recognition was investigated by Rastle et al. (2000) whose results showed that morphological structure plays a significant role in the early visual recognition of English words that is independent of both semantic and orthographic relatedness.

It should be mentioned, that the authors of the presented studies assume universal nature of a morphologically complex sign and have not classified the stimuli used with respect to different types of derivational models (lexical (mutation vs. modification) vs. syntactic) (see Balli, 1966; Kurilovich, 1962). However, one cannot deny semantic and functional differences in derivational models of different kind. Some models are just aimed at evaluation transformation (diminutive models); others lead to the transformation of lexical and grammatical function which cannot be ignored while studying morphological and semantic aspects of their processing.

The present study examines the interplay of morphological and evaluation effects within a separate syncretic derivational model occupying intermediate position between the models of mutation and modification types (Dokulil, 1962) of the Russian derivational system. The material was chosen due to the dual nature of the studied derivational model. The model is seen to take an intermediate position between mutation and modification models. The two models are contrasted on the basis of the transformation they cause in a word. Mutation results in a new lexical meaning (uchitel’ (a teacher)) whereas modification just adds an additional (usually diminutive or augmentative) component to the existing meaning (dom (a house) – domik (a small house)). Syncretic derivational model comprises the characteristic features of both models and produces derivatives with not only
transformed but also ‘flavored’ lexical meaning. For example, a derivative **govor-un** (talker) was formed according to the following derivational model: **govorit’** (a verb) + suffix-**un** = **govor-un** (a noun) (talker). The meaning of the derivative can be presented by the following motivational formula: **govor-un** (talker) – a person who talks (nomination) and talks a lot (objective evaluation) and one might like it or not (subjective evaluation). As it can be seen from the example a semantic component of evaluation was brought up during the derivational process itself. Thus, it is hypothesized that evaluation might have been of a morphological nature in the case described. The research has two main aims: to reveal morphological effect in the derivatives of the syncretic model both in words and pseudo-words and investigate the nature of the semantic effect of evaluation (if revealed), which can be either part of morphological or lexical processing. Morphologically structured pseudo-words were used to assess whether morphological information is processed before lexical identification (Taft, 1994), or upon lexical identification (Giraudo & Grainger, 2001). It is hypothesized that morphological effect on pseudo-words will advocate the idea of pre-lexical morphological processing. Derivational forms are predicted to take longer to be recognized than non-derived forms both for words and pseudo-words. The semantic issue raised in this study is aimed to revive the discussion on the semantic status of a suffix in isolation and to actualize the idea of interactive nature of a base and a suffix relationship advocated by derivational and lexicalological approaches to the nature of derivational process (Yanzenezkaya, 2014). It is hypothesized that evaluative component would also inhibit the recognition of suffixed words and pseudo-words due to a sequential processing of a base, suffix and their interplay.

2. Method

2.1. Participants

45 university students (40-females, 5-males), aged 18-30 years (mean age 21.3 ± 2.5) participated in the experiment.

2.2. Stimuli and Design

Russian nouns with derivational suffixes constituting a syncretic derivational model in the Russian derivational system were employed. The syncretic derivational model comprises a limited list of derivational types in Russian, such as: Verb + suffix -ok, -ach, -uh(a), -k(a), -ulj(a), -sh(a) – ush(a), -oh(a), -ah(a), -ag(a), -ak(a), -l(a), ug(a). E.g.: p’et’ (to sing)–pev-uhu; pisat’ (to write) – pis-aka; hohot’ (to laugh loudly)– hohot-un; strel’ yat’(to shoot) – strel-ok. Adjective + suffix -ak, -ach, -k(a), -uh(a), -ush(a), -yshk(a), -ish, -ag(a), -ug(a), -uk(a), -ul’(ja). E.g.: lovkiij (crafty) – lov-ach; veselyij (jolly)–veselch-ak. Noun + suffix -ach, -an, -jag(a), -un, -jush(a), -jush(a). E.g.: politika (politics) – politik-an; nos (nose) – nos-ach; stil’ (style) – stil-yaga (see a detailed structural and semantic description of the discussed model in Rezanova (1996) and Nagel (2005, 2014).

The syncretic derivatives of the type described above (N=40) were used along with non-suffixed words (N=40) (e.g., dotsent (docent) and suffixed (N=40) and non-suffixed pseudo words (N=40) (dolz-yak vs. shmazk). All words and pseudo words were matched for length, ranging from 4 to 9 letters (Mean ± 1.3). Semantic evaluation was regarded as a variable for suffixed and non-suffixed words (evaluative vs. neutral) as well as for suffixed pseudo-words where it was judged by the presence of evaluation charge in the suffix itself (Russkaya grammatika, 1980). Positive and negative evaluation charges were balanced. Word frequency was not fully controlled due to a limited number of syncretic derivatives satisfying length and evaluation criteria.

The recognition of suffixed and non-suffixed words and pseudowords was studied with the following factorial (words) and nested (pseudowords) designs:

- WORDS: 2 (Morphological Complexity: Derivative vs Simple) x 2 (Evaluation: Evaluative vs Neutral)
- PSEUDOWORDS: Morphological Complexity (Derivative (Evaluation: Evaluative vs Neutral) vs Simple).
2.3. Procedure and Apparatus

Each participant was tested individually in a quiet room. The stimulus items were presented in the middle of a computer screen. Prior to presenting a stimulus, a fixation point appeared on the screen for 500 ms, which was then replaced with a stimulus item appearing in the same screen position (1000 ms or until the response). By pressing a key (1 for a word, 0 for a pseudo-word), participants were to decide as quickly and accurately as possible whether a letter string was a Russian word or not (a lexical decision task). The stimuli appeared in black lowercase 12 point Times New Roman letters on a white background. The stimuli were followed by inter-trial interval (1500 ms). Twenty practice trials (ten words and ten pseudo-words) preceded the actual experiment. The experiment lasted about 10 min.

Lexical decision times were registered with ASUS PC using experiment generator programme E-Prime 2.0 (Copyright 1996-2012 Psychology Software Tools).

3. Results and Discussion

Data of two subjects were excluded from the analysis due to their poor performance on the task with an accuracy rate less than 70% and reaction time smaller than 400ms. The overall error rate of the remaining data constituted 9%. The errors were excluded from the reaction time analysis but were retained in the analysis on accuracy.

Analysis of Accuracy. A two-way analysis of variance (ANOVA) on means by subjects and by items on accuracy (in %) revealed main effect of morphological complexity for words (F_s(1,278)=10.63; p<0.001; F_i(1,158)=4.89; p<0.02) and pseudo-words (F_s(1,118)=3.24; p<0.07; F_i(1,78)=4.29; p<0.05) which suggested that in recognition of words and pseudo-words subjects made more errors when a word contained a legal morph.

Main effect of evaluation and interaction were not significant (all ps>0.1), thus, rejecting the hypothesis of derivational nature of evaluation.

RT analyses. ANOVA for words and one-way ANOVA for pseudo-words were conducted separately, each analysis on subjects and items. The analyses revealed that a main effect of morphological complexity was highly significant in the task performed both for words (F_s(1,156)=26.92; p<0.001; F_i(1,76)=14.10; p<0.001) and pseudo-words (F_s(1,118)=2.58; p <0.11; F_i(1,78)=13.50; p < 0.001). The data in Table 1 show that words and pseudo words with derivational morphemes were processed slower than words and pseudo words without the morphemes.

Table 1. Means and standard deviations (in parentheses) per morphological complexity condition

<table>
<thead>
<tr>
<th></th>
<th>simple</th>
<th>derivative</th>
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<tbody>
<tr>
<td></td>
<td>items</td>
<td>subjects</td>
</tr>
<tr>
<td>words</td>
<td>588 (56)</td>
<td>580 (54)</td>
</tr>
<tr>
<td>pseudo words</td>
<td>651 (32)</td>
<td>658 (82)</td>
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</table>

The results support the view that morphological effects come into play at a morphological processing stage with decomposition based on the suffix presence.

Evaluation factor was marginally significant in words (F_s (1,156)=3.23; p < 0.07; (F_i(1,76)=4.83; p < 0.03) and insignificant in pseudo-words Fs(1,78)=0.84; p >0.36; Fi(1,39)=1.70; p >0.14). No interaction of morphological complexity and evaluation was revealed (all ps>0.4), which disputes the idea of morphological nature of evaluation in the derivatives under discussion.

4. Conclusion

One of the purposes of this study was to replicate on the basis of the Russian language the morphological effect consistently found in a variety of languages. The experiment showed that suffixed words and pseudo-words, as morphologically more complex items, take longer to be recognized as well as less accurately. Presumably, more time-consuming morphological decomposition route is being used during word recognition.

The second purpose of the study was to explore the interplay of morphological complexity and evaluative
semantics. As a result, insignificance of evaluation factor and absence of morphological complexity and evaluation interaction in pseudo-words with legal morph was discovered. This fact supported the idea of interactive nature of a base and a suffix relationship advocated by derivational and lexicological approaches to the nature of derivational process. Marginally significant evaluation effect in words showed that though taking intermediate position between nominative and evaluative derivational models, syncretic derivatives would probably reveal their evaluative nature in context though more study is needed to claim that. Lack of evaluation effect in the syncretic derivatives also raised an issue of morphological nature of evaluation in a particular derivational model and stimulated further research in this direction with the employment of derivatives of modification model where evaluative transformation during derivational process is seen as primary.

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References

Diependaele, K., Grainger J. & Sandra D. (2012). Derivational morphology and skilled reading. In M. Spivey, M. Joanisse & Ken McRae (Eds.), Cambridge Handbook of Psycholinguistics (pp. 311-332).
Nagel, O. (2005). Russian nominative word formation types of syncretic semantics (functional and cognitive perspective). (Russkie imennye
slovoobrazovatel'nye tipy sinkretichnoy semantiki (funkcional'no-kognitivnyy aspekt)): Diss. ... kand. filol. nauk. Tomsk. (in Russian)