Idiom comprehension in the first language: a developmental study

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Abstract

While adult idiom comprehension has been addressed fairly extensively in experimental research across languages, developmental studies have emerged more recently and have primarily addressed English and few other languages. In this study we tested for the first time idiomatic knowledge in younger children (preschoolers), and older children (third-graders) with Bulgarian as L1, compared to adults. Our main hypothesis was that around age ten children's knowledge of idioms starts approximating adult-like knowledge (Kempler et al., 1999). We hypothesise that the ability to work with figurative language (including idioms) correlates with age and years of schooling and is linked to other linguistic abilities, e.g., meta-linguistic awareness, and the ability to infer from context (Benneli et al., 2006; Levorato & Cacciari, 2002). Our hypotheses were confirmed. While idiom comprehension is scarce among the younger group, the older children display advanced linguistic skills in the comprehension and interpretation of idioms. Our study also provides independent evidence of usage-based theories of language acquisition (Tomasello 1992, 2003), and embodied perspectives on language (Barsalou et al. 2003).

Keywords: idiom comprehension, lexical development, age of acquisition, deep biological background for language, meta-linguistic awareness,

Resumen

La cuestión de la comprensión de frases hechas (*idioms*) usadas por adultos se ha estudiado bastante ampliamente en la investigación experimental en muchas lenguas, pero los estudios de su desarrollo han aparecido más recientemente y se han hecho

sobre todo en inglés y en algunas otras lenguas. En este estudio hemos investigado por primera vez el conocimiento de frases hechas en niños de preescolar y niños de más edad (tercer año) cuya lengua materna es el Búlgaro, y lo hemos comparado con el de adultos. Nuestra hipótesis principal fue que, alrededor de los 10 años de edad, el conocimiento de frases hechas empieza a ser semejante al de los adultos (Kempler et al., 1999). Otra hipótesis es que la capacidad de trabajar con lenguaje figurativo (incluyendo frases hechas) es correlativo con la edad y los años de escolarización y se conecta con otras capacidades lingüísticas, como son el conocimiento meta-lingüístico y la capacidad de crear inferencia en un contexto (Benneli et al., 2006; Levorato & Cacciari, 2002). Se confirmaron ambas hipótesis. Mientras la comprensión de frases hechas es escasa en el grupo más joven, los niños mayores muestran habilidades linguísticas avanzadas en la comprensión e interpretación de frases hechas. Nuestro estudio además muestra evidencia independiente de teorías de adquisición de lenguas basadas en el uso (Tomasello, 1992, 2003), y perspectivas del lenguaje incrustadas (Barsalou et al. 2003).

Palabras clave: comprensión de *idioms*, desarrollo de léxico, edad de adquisición, base biológica de lenguas, conciencia meta-lingüísitica.

1. Introduction

While adult idiom comprehension has been addressed fairly extensively in experimental research across languages, developmental studies have emerged more recently and have primarily addressed English and few other languages, such as Italian and French. In this paper we address idiom comprehension from a developmental perspective. Nippold (2006) claims that idiom comprehension, along with the comprehension of metaphors, and proverbs develop gradually during the life-span with adults excelling on such tasks compared not only to younger children, but also to older children and adolescents. Kempler et al. (1999), however, suggest that age 10-11 is the stage when children's knowledge of idioms starts approximating adult-like knowledge. Research in idiom comprehension and processing in children (Benneli et al. 2006 , Levorato & Cacciari 2002), has further suggested that the ability to work with figurative language (including idioms) correlates with age and years of schooling and is linked to other linguistic abilities, such as meta-linguistic awareness, and the ability to infer from context. In this paper we report the results from a study designed to test for the first time idiomatic knowledge in younger children (6-7 years), and older children (9-10 years) with Bulgarian as L1, as compared to adults. Our results confirm convincingly our hypothesis about levels of knowledge at these ages, and provide independent evidence of usage-based theories of language acquisition (Tomasello 1992, 2003). We further show that, while idiom comprehension is scarce

among the younger group, children aged 9-10 display advanced linguistic skills and are capable of providing elaborate definitions and synonyms for the target items. Our study also shows that children only resort to literal interpretations in the cases when they do not know the idiom, and that some of their "incorrect" responses reflect an embodied perspective on language (Barsalou et al. 2003).

Idioms enjoy a special place in language structure and organisation. On the one hand, they appear to belong to the lexicon in that they have to be acquired and stored in ways similar to lexical items (words), and, on the other, they invite processing similar to structures generated by grammar, due to their size and structure, which is above the level of the word. Owing to this "double" nature, the interpretation of idioms may pose problems. Compared to non-idiomatic expressions of the same length, idioms are more demanding in terms of processing. According to Romero Lauro et al. (2008) this is due to processes of alternative meanings selection and inhibition in the case of idioms. In this respect, idiomatic meaning appears similar to figurative meaning. There are other parallels between the two, for instance, in terms of how meaning is computed – in both cases the computation is only indirectly based on the component parts, if at all. An interesting research question is at what stage in language acquisition are idioms acquired, and to what extent is this related to e.g., the ability to process figurative language, pragmatic language skills and meta-linguistic knowledge. In addition, insights into how speakers store and process idioms can shed light on the question of where in language ontology idioms belong.

Findings and claims in previous research are, in part, controversial. Studies have shown that idioms are not understood before age 6 (Abkarian et al. 1992) and this is the likely age when the ability to interpret idioms takes off. However, while Nippold (1998, 2006) compares the development of idiom understanding to lexical development claiming that it is gradual, and virtually unlimited, other studies suggest that figurative competence develops between 7 and 11 years of age (Levorato & Cacciari 1995, Cain et al. 2009). Kempler et al. (1999) provide evidence from a large cross-sectional study that idiomatic knowledge starts plateauing after age 11 and approximates the adult state.

In this paper we look at idioms from a developmental perspective, and investigate how, and at what age such expressions are acquired, and to what extent they pose a difficulty in language development. We address further the dynamics of acquiring idiomatic knowledge, and whether age 6-7 indeed represents the initial stage of this process, and how idiom acquisition progresses. If our target age groups are correctly chosen, and, if, as suggested by Kempler and colleagues (1999), age 10 is a turning point, then one would expect to find greater differences between younger children and adults, than the differences between 10 year-olds and adults. We also ask the

question whether different types of idiomatic expressions tend to be acquired at different rates.

2. Theories of idioms

2.1. The nature of idioms

A widely accepted view is that idioms are stored in the mental lexicon, much in the same way as words, the only difference being in terms of structural complexity and size (Gibbs, 1980). While in the case of words, there is a simple association between a lemma (semantic) and a lexeme (phonological) representation, for idioms, there is a complex phonological representation comprising a string of individual lexemes. Idioms function as items of word size and can be inserted, replaced or deleted very much like words, and quite often, by items of word size. Semantically, they can participate in the same type of systemic relations of opposition (antonymy), similarity (synonymy), and the like. At the same time there are many differences between words and idioms. Idioms have a different grammar which resembles that of phrases and clauses, and may, to a certain degree participate in various alternations and derivations (e.g., passives) or modification (adverbial or adjectival).

Idioms are expressions of varying degree of fossilisation or frozenness and semantic transparency. Unlike regular phrases and expressions, which are generated by the rules of grammar, idioms come largely in a "pre-packaged" form, with many, if not all of their components that cannot be freely replaced or supplemented. *Kick the bucket* is one of the most often used and notorious examples used to illustrate the nature of idioms. As pointed out by Nunberg et al. (1994), and discussed in Jackendoff (2002), many idioms appear only with special overt syntax, which cannot be changed or modified – *play hard to get* (tough-movement), *How do you do?* (wh-movement), *Johnny-come-lately* (compound). However, there are many expressions of idiomatic nature that have variables, are semi-transparent, and, as a result, can be in part subjected to syntactic analysis – *take X to task, take NP for granted, V NP's head off/heart out*. Thus, a more subtle typology of idioms will recognise and distinguish between fixed/non-transparent and flexible/semi-transparent expressions, as proposed in Jackendoff (2002), and as reflected in the compositionality continuum of Nunberg (1978) and Nunberg et al. (1994). Also, it should be kept in mind that there is an interesting correlation between the degree of flexibility in form and semantic interpretation - the more fixed the surface form of the expression is (i.e. the more frozen), the more de-semanticised its component parts become.

2.2. Theories

There are two types of theories concerning the storage and processing of idioms. According to the lexical representation hypothesis (Swinney & Cutler 1979), idioms are stored in the mental lexicon as complex words and are largely identified as other lexical items. The process of computing the meaning of an idiom involves two parallel processes, a retrieval process, which runs in parallel to a literal compositional computation based on the meanings of its component parts. Since the literal computation takes longer, the direct access or retrieval process eventually wins, and the idiom is recognised before the literal meaning becomes available. If this view is correct, then, in most types of idioms, speakers initially try both strategies, but eventually, end up with the idiomatic meaning, since it is retrieved faster than the literal one due to long-term memory storage in the mental lexicon. As a consequence, the rule of thumb for idioms, much in the same way as for lexical items, may read "you either know it or you don't". However, this rule may only apply straightforwardly to the category frozen non-transparent idioms (e.g., like *kick the bucket, a penny for your thoughts, break the ice, Double Dutch*), and to a much lesser degree to flexible transparent idioms (e.g., *figure NP out, make waves, look for trouble*). Even within the group of frozen idioms, there may be specific key words in the expression whose presence may be crucial to idiom identification. Thus, in the expression *play with fire*, the interpretation depends on identifying both constituents, the verb *play* and the noun phrase *fire*, combined with the awareness that both need to be interpreted in a figurative way. Indeed, such a hypothesis has been proposed (cf. Hamblin & Gibbs 1999), the idea being that many idioms are decomposable with their individual components contributing independently to their overall figurative (non-literal) interpretations. Thus, even for idioms, such as *kick the bucket*, it is claimed that the head verb, and its grammatical and semantic properties affect both the interpretation and the appropriate context of usage for each idiom.

Such considerations align with the other salient hypothesis concerning idiom recognition, the configuration hypothesis. Experimental work in the 90-ies has demonstrated that idiom comprehension cannot be reduced to lexical access and lexical retrieval (Cacciari & Glucksberg 1991; Gibbs 1992, Glucksberg 1993). The configuration hypothesis assumes that idioms are represented in a distributed way and their processing resembles the processing of any complex expression, involving mechanisms that operate at the clausal level (Cacciari & Tabossi 1988). In a recent paper, Tabossi, Fanari & Wolf (2005) provide experimental evidence that spoken idiom identification differs from word recognition, in that it occurs word-by-word, much in the same way as multi-lexical phrases.

Now, an interesting question concerning the viability of the above two

hypotheses is when do children become aware of idioms as a category? This involves the (metalinguistic) awareness that, despite appearances, idioms are similar to words. A second issue is related to the size of the idiom lexicon of children of different ages and what strategies children resort to when asked to provide the interpretation of an idiomatic expression.

3. Idioms from a developmental perspective

Recent research (Kempler et al. 1999, Nippold 1998, 2006, Nippold & Duthie 2003, Cain et al. 2009, Levorato & Cacciari 1995) suggests that the acquisition of idioms takes longer than vocabulary acquisition, and that it gradually takes off after age 5 and on. Opinions, and findings, however, divide concerning the path of this development. Nippold (1998, 2006) and Nippold & Duthie (2003) assume that this is a gradual development not essentially different from other lexical development. However, Kempler et al. (1999) show that the understanding of idioms follows a non-linear path, very similar to the vocabulary burst between the second and the third year (Marchman & Bates 1994, Bates & Goodman 1997). However, with idioms, this process takes approximately 4 times longer with a peak at around 11 years, and its onset is much later.

Nippold & Duthie (2003) mention a couple of factors that play a role in idiom acquisition and comprehension. The most salient ones are frequency of the expression, transparency of its structure, the context in which it is encountered, and linguistic skills and competences. It is commonly agreed and has been demonstrated that meta-linguistic awareness facilitates the understanding of figurative language, including idioms (Nippold 2006, Nippold & Duthie 2003, Levorato & Cacciari 2002). It has also been shown that reading comprehension is a strong predictor of idiom comprehension (Levorato et al. 2004). According to Nippold (2006) semantic development includes the development of skills in processing metaphors, idioms and proverbs. She predicts that due to their structure and composition, proverbs are the most difficult to acquire. Much indicates, however, that they can be processed "on-the-fly" and more easily than non-transparent idioms, if we consider their linguistic structure.

In line with these ideas, we hypothesised that age 10 is a likely turning point in idiom storage and comprehension, and that around that age children's performance approximates that of adults. We also expect that, while younger children around age 6-7 would be at the beginning of the process of idiom acquisition, and their knowledge of this category would be highly limited and idiosyncratic, and restricted primarily to the category of idioms based on analogies with the body and daily experience (e.g.,

transparent idioms), older children would show a pattern similar to adults across all three categories of idioms**.**

4.The experimental study

4.1. Design

We designed an idiom comprehension study targeting some answers to the questions above. The stimuli contained 56 frequent idioms in Bulgarian which received an overall familiarity score of .9323 from a group of 100 native speakers in a preliminary study. These idioms were divided by the experimenters in the following categories: a/ biologically-based idioms; b/ culturally-based idioms; and c/ what we called INSTRUCTIVE idioms. For the first two categories we followed the typology adopted in Penttilä, Nenonen & Niemi (1998), in turn inspired by Searle's (1983) idea of deep background (the human biological nature) vs. local background (local cultural practices) as explaining the grounding of language in human experience and practice. Examples of biologically-based idioms are e.g., *feel it in one's bones*, and of culturally-based idioms, *a red herring*, e.g., as related to cultures that survive on fishing. The difference between the two categories is that, while biological idioms tend to be more transparent, and available to compositional parsing, cultural idioms are more idiosyncratic, tend to vary from one culture to another, and are in general less transparent. Thus, another fishing culture, the Norwegian one, employs a very different expression as the equivalent of English *red herring*, *'på bærtur'* (lit. 'on a (wild) berry trip'). Our third category, instructive idioms, are labelled so, because they are largely proverbs, whose meaning can be computed on-line, by drawing inferences on the basis of their individual constituent phrases (e.g., *Beauty is in the eye of the beholder*).

The focus of the current study is on the stage around 10 years as the age when idiomatic knowledge gets consolidated and starts approximating adult knowledge. For the purposes of comparison, we also included two other age groups, preschoolers between six and seven years and adults. Our main hypothesis was that the differences between the younger children (age 6-7) and the adults would be greater than those between the older children (age 10) and the adults. We further hypothesised that children would primarily exhibit knowledge in the field of biological idioms, with greater gaps in the other two categories, while adults' knowledge would be even across all three categories. We also hypothesise that the years between 6 and 10 are the most active years of acquiring idiomatic knowledge, reflected in more pronounced dynamics of the growth of the idiom lexicon.

Our specific hypothesis concerning ten-year-olds was that they would a/ have a notion of idioms as a category; b/ know the majority of the most frequent idiomatic expressions in the language; c/ be more likely to have more problems with cultural idioms, but not with proverbs; and d/ would attempt to provide literal interpretations only in the cases when they do not know the meaning of the idiom.

4.2.Participants

The participants were 20 preschoolers (mean age 6;8) from Sofia, 20 3rd grade students (mean age 9;5) and 22 adults from Sofia (mean age 41). The results of two of the adults were excluded from further analysis due to failure to comply with the instructions of the task, leaving us with 20 adult scores.

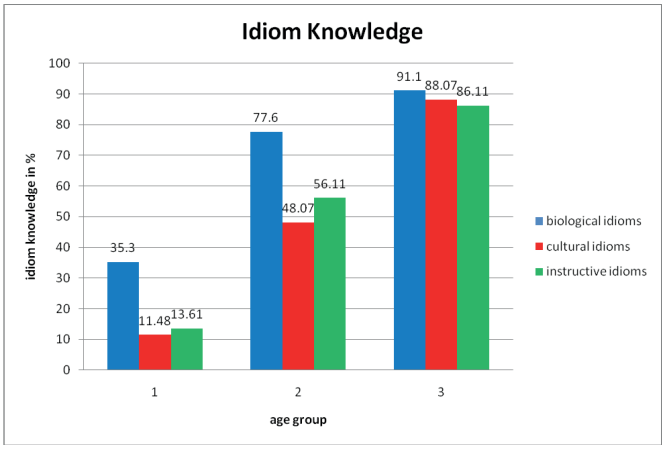
4.3. Materials and procedure

Stimuli – 56 idiomatic expressions compiled through dictionary searches and other reference sources. (There are no frequency references available for idioms in Modern Bulgarian**).** These included 25 biologically-based idioms, 22 culturally-based idioms, and 9 instructive idioms. The task was to provide a free interpretation of the meaning of the idiom orally. Answers were entered on scoring sheets by an experimenter and then scored jointly by a committee of three experimenters. Results were scored in the following way: correct idiomatic responses received a score of 1, incorrect responses scored 0, and responses, where the participant had attempted an idiomatic, albeit somewhat imprecise, interpretation received a score of 0,5.

5. Results

All three groups performed as expected and according to our original hypotheses. While younger children had an overall success rate of 22,46%, older children had 62,54%, with adults showing a very high overall score of 88,21%. Results in the three domains of idiomatic knowledge were more varied, with all three groups demonstrating better knowledge in the area of biological idioms, this being the only area where the younger group had any significant knowledge (mean success rate 35,3%), ten-year-olds with 77,6%, and adults with 91,1%. For cultural idioms the success rate of the younger group was 11,48% and only 13,61% for instructive idioms, while for older children these were 48,07% and 56,11% respectively. Adults' scores were very high again: 88,07% and 86,11%, respectively (Fig. 1).

Figure 1. Idiom knowledge of the three age groups in percentage

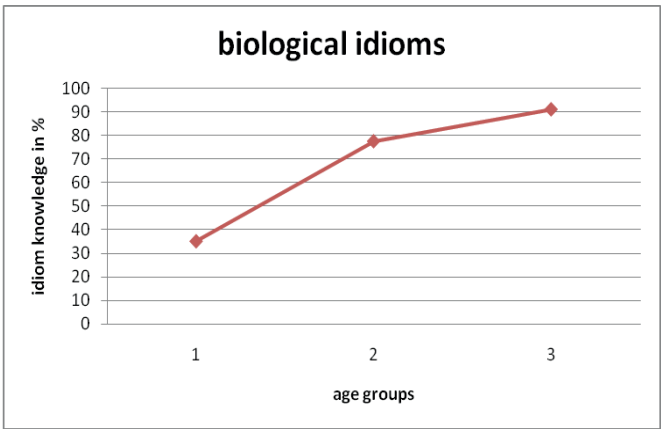


For biological idioms (25 stimuli), the mean is 8,82 (SD 4,01) in the preschoolers group, 19,40 (SD 3,21) in the group of ten-year-olds, and 22,77 (SD 1,60) in the group of adults (Tabl. 1). The knowledge of biological idioms increases rapidly between ages 6-7 and 10, and more smoothly between age 10 and adults (Fig. 2).

Table 1. Means and standard deviations of the three age groups in the idiom categories

	age group 6-7 y. (n = 20)		age group 10 y. (n = 20)		age group 41 y. (n = 20)	
	mean	SD	mean	SD	mean	SD
biological idioms	8,8250	4,0173	19,4000	3,2184	22,7750	1,6098
cultural idioms	2,5250	1,4553	10,5750	4,6006	19,3750	2,4434
instructive idioms	1,2250	,8955	5,0500	1,6615	7,7500	1,1754
overall	12,5750	5,1178	35,0250	8,4456	49,4000	4,2321

Figure 2. Idiom knowledge in percentage for biological idioms



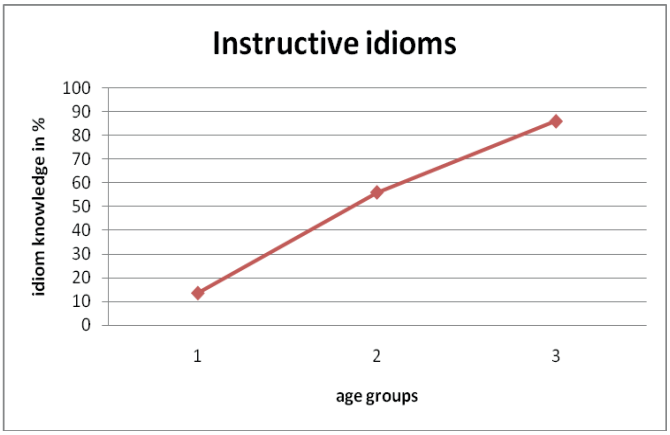
For cultural idioms (22 stimuli), the mean is 2,52 (SD 1,45) in the preschoolers group, 10,57 (SD 4,60) in the 10 year old children group, and 19,37 (SD 2,44) in the adult group (Tabl. 1). The success in this category in the different age groups increases gradually (Fig. 3).

Figure 3. Idiom knowledge in percentage for cultural idioms

For instructive idioms (9 stimuli), the mean of the preschooler group is 1,22 (SD

0,89), 5,05 (SD 1,66) in the 10 year old group, and 7,75 (SD1,17) in the adult group (Tabl. 1). The knowledge of instructive idioms increases gradually (Fig. 4).

Figure 4. Idiom knowledge in percentage for instructive idioms.



A oneway ANOVA showed significant differences across idiomatic knowledge in all three target groups, and in all three domains of idiomatic knowledge. The results following the three categories of idioms are: a) biological idioms - $F(2) = 109{,}262$, $p < .001$; b) cultural idioms - $F(2) = 145{,}681$; $p < .001$; c) instructive idioms - $F(2) = 130{,}451$, $p < .001$ and d) overall - $F(2) = 179{,}045$, $p < .001$.

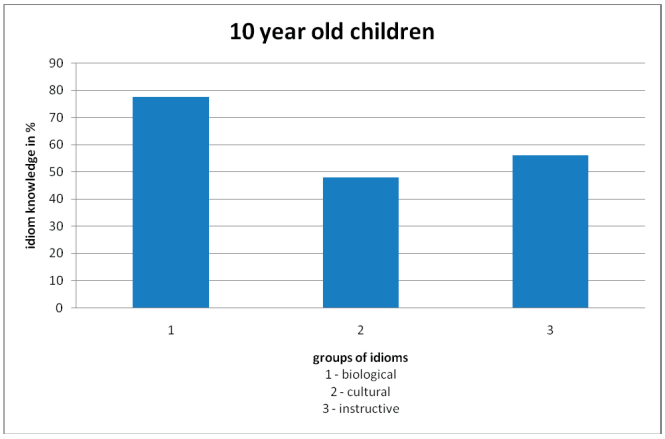
However, independent sample t-tests revealed that differences were greater between the younger children and the adults than between the older children and the adult group. The first t-test concerns the comparison between the six-year-olds and adults. The results are: a) biological idioms - $t(38) = -14{,}415$, $p < .001$; b) cultural idioms - $t(38) = -26{,}497$, $p < .001$; c) instructive idioms - $t(38) = -19{,}748$, $p < .001$ and d) all idioms - $t(38) = -24{,}799$, $p < .001$.

The next t-test compares the 10 year old children and adults. The results show: a) biological idioms - $t(38) = -4{,}194$, $p < .001$; b) cultural idioms - $t(38) = -7{,}555$, $p < .001$; c) instructive idioms - $t(38) = -5{,}933$, $p < .001$; and d) all idioms - $t(38) = -6{,}805$, $p < .001$. The difference is significant in the two tests, but the T - value is lower in the comparison between ten-year-olds and adults.

Below we present in more detail the results of the older children group, which was the focus of the current study.

Our hypothesis concerning ten-year-olds degree of familiarity and knowledge of idioms, as divided initially in categories was borne out. As evident from the means for the respective categories (see Fig. 1), the group as a whole was more accurate and successful at providing the meaning of biological idioms, followed by instructive idioms and, finally cultural idioms (Fig. 5). That cultural idioms represented the most difficult category is evident from the fact that performance on this particular group of expressions displays the greatest standard deviation (4,73). This is not surprising, since cultural idioms are the category displaying greater variation cross-linguistically, whose members tend to be less transparent, and have a less clearer origin, e.g., by being deeply rooted in sometimes obsolete cultural practices (cf. Penttilä et al. 1998). These idioms are also the ones that present difficulties for L2 learners (Irujo 1986, Argaw Tegegn 2003, Getahun 2003, among others). It appears then, that the rule of thumb, applies here: language users either know the idiom or not. Here comprehension will depend on frequency factors and degree of exposure to linguistic input in that area.

Figure 5. Idiom knowledge in ten-year-old children



We also hypothesised that biological idioms, by being deeply rooted in the human body and its interaction with the environment, are a/ more transparent, and as a result, b/ easier to store, and c/easier to process. This prediction was borne out in our experiment. The idioms with highest scores across all participants overwhelmingly belong to this category. 12 (out of total 25) biological idioms score ,8500 and above on familiarity to participants in the group, while there are only 2 such idioms in the other two categories, 1 in each culturally-based and instructive idioms. In contrast, among idioms that score lowest, and below ,3000, there is only one biological idiom, while the remaining 6 belong in the category culturally-based (5), and instructive (1). Further evidence of the differences in degree of familiarity among the 3 categories

of idioms comes from the range of accuracy/success on each category. While for biologically-motivated idioms the minimum is 12,5, which means that the children who did worst knew at least half of the expressions in that group, for culturally-motivated expressions, the minimum is 3,5 amounting to only 16% familiarity, and 1,5 (16% familiarity), respectively, for instructive idioms. Observe, however, that the maximum performance does not differ dramatically across the 3 categories: 23 (= 92%) (biologically-motivated), 18,5 (84%) (culturally-motivated), and 7,5 (83%) (instructive idioms). This means that individuals scoring highest do so evenly across all idiom types. These latter results demonstrate a main point about the nature and storage of idioms, namely, that irrespective of category, once stored, they are available for retrieval when necessary. Our findings comply further with the factors that have been suggested to play a role in idiom acquisition and understanding, e.g., exposure to input, metalinguistic skills, inference from context, and more general text comprehension. In addition, it seems that instructive idioms differ slightly in that respect, and success on that category depends also on experience and the ability to infer from minimal context. We illustrate some high scoring, and some low scoring items and discuss possible explanations for these results in the discussions section.

Our hypotheses concerning degree of awareness and idiomatic knowledge among ten-year-olds was also confirmed. Our results convincingly demonstrate that at this stage many children have acquired more than half of the most frequent idioms in the language, judging by the composite mean score of 35,0250 (out of 56 possible), with some children demonstrating very high scores at ceiling (maximum score of 48). These facts lend support to the idea that these children are aware of the category as such, and possibly the fact that such expressions are idiosyncratic, word-like, and need to be processed in a special way. We find such evidence in many of the individual responses.

Further evidence of the differences among the three categories of idioms comes from the histograms reflecting individual results within each category. Thus, for biologically-motivated idioms, the number of children who succeeded on more than 19 items is 75% (Fig. 6a), while for cultural idioms there is a wider variation, and the results spread across the full score continuum (Fig. 6b). Finally, for instructive idioms (Fig. 6c), 90% of the children score above 4 items (nearly half of the test items). It should be observed, however, that in neither category there is a normal spread of results in the population. This latter result most likely reflects the quirky nature of idioms, which affects predictions concerning the likelihood of success (or lack thereof) in their comprehension.

Figure 6a. Scores of ten-year-old children for biological idioms

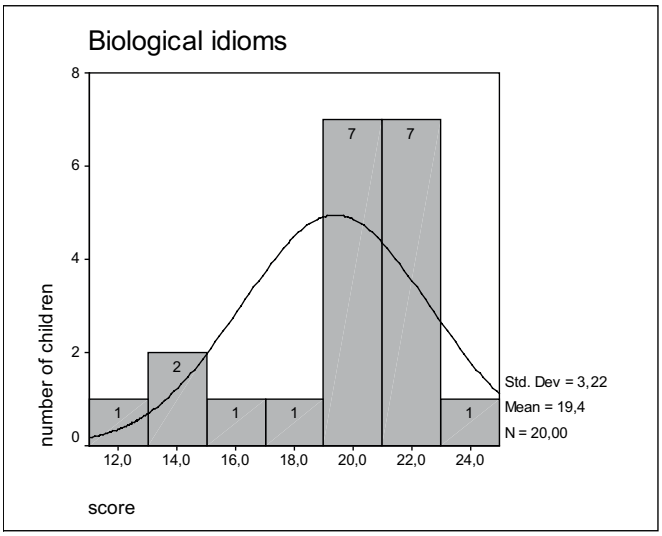


Figure 6b. Scores of ten-year-old children for cultural idioms

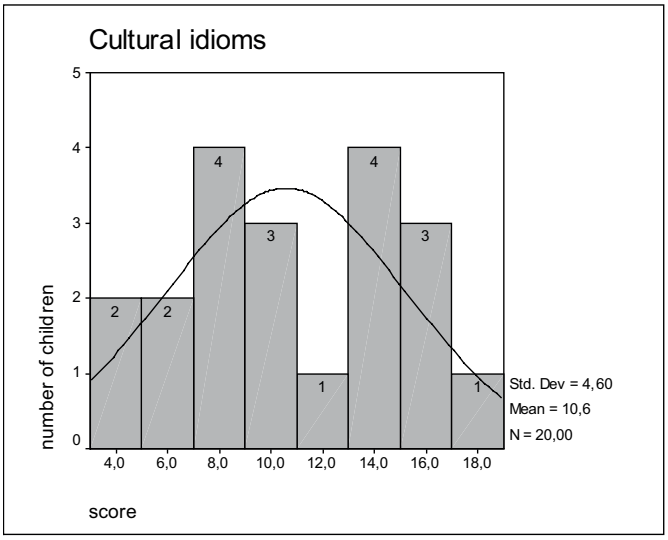
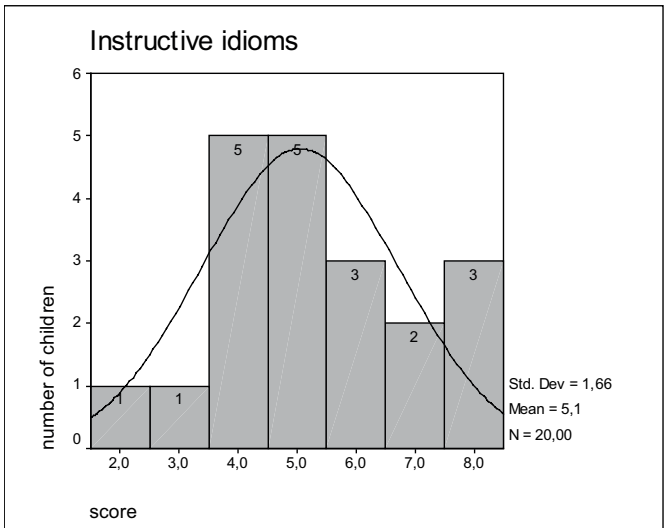


Figure 6c. Scores of ten-year-old children for instructive idioms



Finally, the hypothesis that children would attempt a literal compositional interpretation, in the cases when the idiom has not been stored in their mental lexicon, was also confirmed. Almost all incorrect responses contained attempts at literal interpretation. Here are some illustrations: 'My finger is numb', 'When your fingers are broken, you can't move them', 'I am frozen' (for *Not to lift a finger*, lit. 'not to move a finger'); 'The wind is blowing against you', 'I am running and the wind is blowing against me/in my hair' (for *run against the wind/current*); 'pull the dog's/cat's tail', 'a naughty child is pulling the tail of a pet' (for *pull s.b.'s leg*, lit. 'pull s.b. by the tail'). It was interesting that a very popular idiom, *play cat-and-mouse* quite often received literal interpretations. In a similar way, one of the lowest scoring cultural idioms, *play hide-and-seek* also received many literal responses. The latter results align with Homblin & Gibbs (1999) idea that idioms are largely decomposable and their individual parts contribute independently to the overall interpretation. In this case, our suspicion is that the failure to provide idiomatic interpretations in the latter two cases is due to the head verb *play*, which in children's everyday experience correlates strongly with real play, not figurative adult uses of the verb. These results also independently support Searle's idea about grounding language in human experience, and on a more general level, embodiment ideas about cognition and language (Barsalou et al. 2003, Fischer & Zwaan 2008). On this account, children derive interpretations on the basis of their own experience of the world and its mapping onto language. If situation model theories are correct (cf. Zwaan 2008), then, for children, the verb *play* would call up situations of actual, real-life play, rather than figurative cases.

Among responses, there was also another category of "incorrect". These were paraphrases, that aimed at an idiomatic description, however, fell short of being accurate or even correct. This applied to 20% of incorrect responses. Obviously, this latter category suggests a general awareness of the nature of idioms, as reflected in the attempt to provide a non-literal, albeit incongruent, description. A frequent pattern in those responses was to build on a metaphorical extension or interpretation of one of the component words. For instance, in the expression meaning 'to be relieved' (lit. 'a stone fell off my heart'), participants were commonly mislead by either *heart* or *stone* or a combination of both, thus suggesting 'something sad/sadness; a suffering heart' instead of the correct idiomatic meaning. Likewise, for *an experienced person* (lit. 'a shot-at hare'), they had often suggested 'an easily frightened person', obviously based on metaphors related to hares. Thus, even incorrect responses provided answers to some of the questions we addressed, in that children at that age a/are aware of idiomatic and metaphorical meanings, and b/ can work with metaphorical extensions in a creative way, even, if they do not always lead to the target interpretation.

6. Discussion

In general, our results have confirmed our initial hypothesis concerning age 10 as a turning point in idiomatic knowledge in Bulgarian as L1. The results in the separate categories of idioms, in addition, lend support to current typologies of idioms, such as the biologically- vs. culturally-based categorisation of Penttilä et al. (1998). Furthermore, we find evidence supporting, in part, both major hypotheses of idiom recognition and processing, the lexical representation hypothesis and the configuration hypothesis. We discuss some of the consequences below.

Our overall results for idiom comprehension are surprisingly similar to the results obtained in the study by Nippold & Duthie (2003) on accuracy scores between the older children and adults (62,54% and 88,21%, respectively in our study, and 64%, and 87%, for Nippold & Duthie, 2003). The latter paper also finds parallel problems for both adults and children in the comprehension of non-transparent items. In contrast, our study reports a balanced accuracy performance across all idiom categories, while this is not true for the older children. More specifically, this applies to the category cultural idioms, which are less transparent, but not to proverbs. Our findings thus confirm the role of input in language development, including figurative language and idioms.

Idioms are an idiosyncratic category, which has given rise to problems for theoretical accounts of the phenomenon, as well as actual problems in the acquisition of idioms both in the L1 and in L2s. The theoretical analysis of idioms is

also hampered by the fact that idioms are not a homogeneous category. Instead, in terms of structure, they range from highly fossilized (frozen) to increasingly flexible, allowing for a number of variables slots to fill. Independently of their structural properties, they also vary in degree of transparency depending on the extent to which they allow for compositional interpretations or not. Obviously, linguists' favourite over the years, *kick the bucket*, is both frozen and non-transparent, the same applying to clichés, such as *by and large*, *all ears*, *that sucks*, while *go/work/proceed by the book* or *go/pay Dutch* are more flexible and open to compositional computation. And, following Jackendoff (2002), if we add certain grammatical constructions, such as e.g., resultatives (Dimitrova-Vulchanova 2003), the range of idiomatic expressions not only increases in sheer size, but also in category: from lexical items albeit bigger than words, to productive grammatical constructions or templates (e.g., V NP PP, as in *drive John out of the way*). In addition, idioms share many properties in common with other domains of language, such as e.g. figurative language, pragmatics in general, the comprehension of humour and irony etc (Nippold & Duthie 2003, Bernicot et al. 2007, Cain et al. 2009). They all depend on a certain metalinguistic awareness of the structure of the language system as a whole, rely heavily on context, and their acquisition and the development of the skill to comprehend and use them rely entirely on specific exposure, i.e. you will not know it, unless your caregivers/ linguistic environment has exposed you to it.

Tomasello's (1992, 2003) usage-based theory of language acquisition suggests that exposure to input is crucial in the process of early acquisition. There is indeed evidence (in Tomasello's own work, among others) that the structures that dominate early grammar acquisition are the ones that individual children are exposed to in the input from caregivers. These early structures are item-based (item-specific), usually structured around a single verb, or word (e.g., question words with clause initial syntax). What precedes this stage are holophrases: chunks of language/expressions stored as wholes. What is surprising is that, on this approach, early grammar is dominated by complex unanalysed expressions stored holistically. Yet, there are very few idioms in early language production. More often, children would use clichés that are readily available, and have clear pragmatic functions. For example: *If you wish, Let me know, By no/all means, What's up?, Not to worry* are both frequent, and can only be used in clearly-defined and specific points of the discourse. It appears that idioms are more challenging in that they depend on, and require a more advanced metalinguistic awareness to be in place. For instance, children ought to be around 5-6 years of age in order to be able to appreciate (verbal) humour (McGhee, 1971; Schultz & Horibe 1974; Loizou 2006). In a similar way, around that age, they can start making observations about the nature and structure of language, i.e. use language to talk about language. Levorato & Cacciari (2002) provide experimental evidence

that the ability to use figurative language in a creative and sensible way requires a long developmental time span and is strictly connected with the ability to reflect on language as a complex cognitive and interpersonal phenomenon. Thus, we suggest that the special status of idioms can be appreciated only around the age when you can reason about language and are aware of its symbolic and arbitrary nature, of intra-systemic relations, and can draw inferences exclusively on the basis of linguistic context. As a matter of fact, Vega-Moreno (2001) suggests that inferential abilities are not only involved in, but also essential, in idiom comprehension.

Unlike the lexicon (words) and grammar (basic language structure), many of the above categories take longer to develop, and have been attested to be in place not earlier than around age 5-6 (Abkarian et al. 1992). Thus, we anticipate that idiom acquisition can only start at this stage. While for English there are many studies of both adult and early usage, except for studies on Italian and French, little is known about the cross-linguistic variation in both age and degree of familiarity with idiomatic language. Our experiment is a first attempt to investigate the dynamics of idiom acquisition with a focus on what we expect to be the starting point (6-7 years) and a turning point (age 10) in this process in Bulgarian as L1. Our results convincingly show that age 6-7 is indeed the starting point of the acquisition of idioms. Thus, some biologically-based idioms (e.g., *get soaking wet, trust one's heart, have sharp wits*) were familiar to 75% of the six-year-olds, while others were virtually unknown (e.g., *to make a mountain out of a molehill*; *be itching to speak*). This pattern is strongly reminiscent of word scores in CDI tables across languages, and confirms that idiomatic knowledge develops similarly to lexical knowledge. Our study also confirms that age 10 is a turning point in the acquisition of idioms and the age whereby children's knowledge in that domain starts approximating adult patterns.

In the absence of any significant standard studies of idiom typology in Bulgarian, we decided to use an appealing and straightforward typology in terms of the source of the idiom (etymology), suggested by Pentillä et al. (1998), and following on ideas originally put forth by Searle (1983). According to this typology, linguistic expressions are rooted in human experience in an embodied way, and idioms may either have a biological source or a cultural source. To this we added our own category, which we believe is justified on theoretically relevant structural and semantics grounds. The new category, which we dub instructive *idioms*, reflects human practice by spelling out a moral in an aphoristic way. Such expressions are often called sayings or proverbs, and have folk-tales, popular stories or human experience as their source. Quite often, the interpretation of this type of idiom is contained in the structure itself and can be derived in a compositional way. Our hypothesis concerning the latter group was that, due to the aforementioned properties, such idioms would be easier to recognise and process compared to other culturally-motivated expressions. This hypothesis was

confirmed by the results in our study, whereby performance on instructive idioms was next best, with cultural idioms as the most difficult group to recognise and explain for participants across all age groups. However, instructive idioms differ both from biologically-motivated and culturally-motivated idioms also on another parameter. Their interpretation recruits the ability to infer from minimal context, which is an ability arising from, among other things, pragmatic skills, comprehension skills, analogical reasoning and the ability to map experience to linguistic expression. Based on this, we believe, that 10 year old children who performed well on that subtask, are linguistically-creative, and characterised by advanced metalinguistic skills, in being able to establish commonalities or parallels between situations that are not so straightforwardly related. Thus bridging putting all your eggs in the same basket, and acting prudently in spreading your investments and efforts across alternatives is a long shot. Likewise, the analogy between flying high and crashing upon landing, and the danger of overrating one's skills and competences, is not so straightforward.

Among biological idioms that scored highest among ten-year-olds and adults we have *get soaking wet* (literal 'get wet to the bones'), *save one's skin*, *make a mountain out of a molehill* (lit. 'make an elephant from the fly'), *the wage-earner* (lit.'the head of the family'), *have a screw loose* (lit. 'a board loose'), *not to get what one has expected* (lit. 'remain empty-handed'), *a keen mind* (lit. 'a sharp mind'), *prick up one's ears* (lit. 'sharpen/prick one's ears'), *get on s.b.'s nerves* (lit. 'walk on my nerves'). The success of this category is straightforward: such expressions build on analogies involving parts of the body, and as such lexicalise and encode the basis of human experience. There is strong evidence that many of them are shared across cultures, and we find almost word-by-word equivalents across the Indo-European languages, but also Finnish (cf. Penttilä et al. 1998). By being basic, they are likely to be part of everyday discourse, and as such, occur more frequently in the linguistic input to which children are exposed. With culturally-based idioms, the story is different. Expectations are that these would vary not only across languages and cultures, but also within a single language across social strata and registers. Some children will never be exposed to some of these expressions or may not get sufficiently rich input to infer the meaning of the idiom. Here are the low scorers: *once bitten, twice shy* (lit. 'once burnt by porridge, you blow on it'), *kick the bucket* (lit. 'throw the cannon'), *play hide-and-seek*, *drink up the bottle* (lit. 'see the bottom of the bottle'), *an experienced person* (lit. 'a shot at hare'), and *a penny saved is a penny earned* (lit. 'he who saves his old clothes, earns new ones'). Clearly, some of these expressions build on either obsolete practices (e.g., eating porridge) or practices that are unfamiliar to children (e.g., hunting and shooting at hares, drinking (spirits or wine) from bottles). What came as a surprise was failure among ten-year-olds at the Bulgarian equivalent of *kick the bucket*. Like its English counterpart, it is non-transparent and completely non-compositional,

however, it enjoys a high frequency, as confirmed by the adult responses. However, there exists a close competitor, the expression lit. 'kick the bell', which appears to be common in specific (low) registers. The availability of this competitor and the likely exposure of some children to this latter expression might be a potential explanation for problems with the expression we had included in the stimuli set. Further evidence to this effect comes from the fact that three of the ten-year-old children actually knew the test expression, while the remaining children did not. This variation appears to reflect exactly the result of exposure to input.

The results from our study underscore the typology of idioms that we have used in that the three different groups appear to be acquired at different rates and with different dynamics, as revealed in the idiom knowledge graphs. Compared to other typologies, the current one also entertains an explanatory power from a cognitive point of view. It offers a straightforward link between language structure (i.e. idiom transparency) and the extra-linguistic and cognitive basis of idioms, and as a consequence, can explain the varying degrees in ease of idiom understanding. The acquisition of biological idioms obviously starts early and appears to reach a saturation point around age 10, as seen in the success rate across the three target groups. These findings concur with ideas put forward in embodiment theories whereby development is contingent on the rich interaction of the individual and his body with the environment. This interaction, which guides development, is the most likely source of knowledge in the domain that provides the basis for biologically-based expressions in language and ensures the early onset of learning such expressions. In contrast, the learning of cultural idioms follows a trivial path similar to the acquisition of lexical items, and entirely depends on exposure to input over time.

Based on comprehension difficulties with some specific idioms, we suggest some potential factors of structural or etymological nature that may pose additional difficulties. Thus, idioms that are based on obsolete grammar or syntax, not only sound archaic, but appear difficult to process for a modern child. For instance, *Xrani kuče da te lae* (lit. 'Feed a dog, to bark (on) you'), we find a purpose clause introduced only by the infinitival complementizer *da* (to), which is unusual in the modern language, where such clauses are usually introduced by the complex complementizer *za da* (for to = so that, in order to). Moreover, this kind of syntax, which is a template often used in advice, suggests the counterintuitive interpretation that feeding a dog is the right thing to do, if you want the dog to bark on you/attack you. Thus, a literal interpretation leads to the wrong parsing. This idiom has a very low success rate among the 10 year old children at barely 0,3750, suggesting that children had problems in its comprehension, most likely due to its misleading syntax. As a matter of fact, the clauses are conjoined in a contrastive way, and they jointly describe the unfortunate situation where you have fed a dog, and the dog turns on you. The

idiomatic interpretation is given in the English equivalent, which is by far more transparent, *to bite the hand that feeds you*.

Other factors that have contributed to difficulties are obsolete (idiosyncratic) lexicalisation, as in *(raboti) bez da podvie krak* (lit. '(work) without twisting/bending a leg'). From the point of view of the modern language, the verb *podvie* ('twist/bend') is odd in the context of the direct object *krak* ('leg'). The expression as a whole refers to a sitting posture where your legs are placed under your body and are bent, however, it is archaic and not transparent to the modern speaker.

On a more speculative note, our results partly confirm the direct access hypothesis of Gibbs (1980), as reflected in the fact that correct responses were only provided for idioms that both the children and adults were familiar with. This evidence suggests that such items must be stored in a certain way, and do not depend on on-line processing. Also most correct responses in the two older groups contained only linguistically elaborate expressions, either in the form of definitions or synonyms, which were not redundant with the idiom. In contrast, incorrect responses featured either redundant material, which repeated word-by-word the idiom constituents or provided a literal description. Since literal interpretations primarily correlated with incorrect responses, and we did not have a measure of processing speed, it is impossible to tell whether parallel processing was taking place, and to what extent, in all cases. We have, however, indirect evidence supporting the configuration hypothesis. In decomposable idioms, such as e.g., *play with fire*, the computation builds on providing figurative interpretations of the two constituent parts, *play* and *fire,* respectively. As already observed, this was among the idioms scoring low on familiarity and comprehension among ten-year-olds. However, many responses were in part correct (7 out of 20), in that, at least one of the components, *fire* was interpreted in a figurative way, i.e., as something dangerous, while the verb *play* was not parsed in a similar idiomatic way. From these responses, it appears that decomposable idioms can be, and are, indeed processed constituent-wise and are supported by a distributed representation that builds on metaphoric extensions of their constituent parts.

One overt criticism to our study may be that it taps exclusively meta-linguistic skills in that we asked participants to explain the meaning of idioms. However, we expect idiomatic knowledge to correlate with such skills in development. Thus, in a recent study Benelli et al. (2006) provide convincing evidence that skills at providing definitions correlate both with meta-linguistic awareness, and age and education, where age 10-11 is a turning point on the path to adult-like skills. Further supporting evidence of education and schooling as the likely source of metalinguistic input comes from the study by Aukrust (2004), where she showed that even in Western

societies (Norway and the USA), talking about language *per se* was not common in either Norwegian or American households, whereby children were more likely to be exposed to this kind of input at school.

Our findings align with the above research, and many responses confirmed the hypothesis that comprehension of figurative (idiomatic) language correlates with metalinguistic competences and skills. The two older groups in our study were very skilled at providing correct interpretations by using two strategies: a definitions strategy and a synonym strategy. Both of these strategies reflect advanced awareness of the intra-systemic nature of language and awareness of language-internal relations. As a matter of fact, many definitions and synonyms in the ten-year-old group were superior to or comparable to those we elicited from adults. In addition, the best scoring ten-year-old children provided excellent idiomatic paraphrases in a consistent way across all three idiom categories, and even for expressions where other children had failed. One such child used 'subject oneself to danger' for *play with fire*, and 'to fight/ oppose problems', for *run against the wind*.

For the current study, our main aim was to provide some initial data on idiomatic knowledge in Bulgarian from a developmental perspective, thus contributing to the cross-linguistic study of this field. We have established that, even though idiom comprehension is an area which develops gradually, in that respect, ten-year old children are more similar to adults than pre-school (younger children). Our results confirm findings in earlier research that idiom comprehension starts around 6 years judging by the low overall scores of the younger children in our study. Further research is necessary to track the developmental stages of idiomatic language with both comprehension, and production data, including data from the processing of idioms in context. Also, the exact correlation between idiom comprehension and use, and metalinguistic knowledge needs to be established in a specifically designed experiment.

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Appendix

Stimuli set as used in the study

Biologically motivated idioms

1. Да се измокря до кости *get soaking wet* (lit. "get wet to the bones")
2. Да си спася кожата *save one's skin*
3. Играя си с огъня *play with fire*
4. Да си играем на котка и мишка *play cat-and-mouse*
5. Хлопа му дъската *have a screw loose* (lit. "he has a board loose")
6. Правя от мухата слон *make a mountain out of a molehill* (lit. "make an elephant from the fly")
7. Изгубвам си главата/ума *out of your mind* (lit. "lose your head/mind")
8. Глава на семейство *the head of the family, wage-earner* (lit. "the head of the family")
9. Тичам срещу вятъра *run against the wind*
10. Дърпам някого за опашката *pull someone's leg* (lit. "pull s.b. by the tail")
11. Скубя си косите *tear your hair out*
12. Доверявам се на сърцето си *trust your heart*
13. Не ми излиза от главата *I can't get it out of my head*
14. Гори ми главата/Пламнала ми е главата *be at one's wits' end* ("my head is on fire")
15. Имам остър ум *have a keen mind* (lit. "have a sharp mind")
16. Не си мръдвам пръста *not to lift a finger* (lit. "not to move the finger")
17. Да наостря ушите си *prick up one's ears* ("sharpen one's ears")
18. Настръхва ми кожата *to become all goose-flesh* ("my skin bristles up")
19. Стига до ушите ми *it has come to my ears*
20. Държа си езика зад зъбите *hold your tongue* ("to hold one's tongue behind the teeth")
21. Ходи ми по нервите/Опъва ми нервите *get on s.b.'s nerves* (lit. "something or someone walks on/strains my nerves")
22. Той няма сърце *He has no heart*

23. Чеша си езика/Сърби ме езика *wag one's tongue/be itching to speak* ("claw o.'s tongue"/"one's tongue itches")

24. Стискам зъби *stiff upper lip* (lit. "clench your teeth")

25. Оставам с празни ръце 'not to get what one has expected' (lit. "remain empty-handed")

Culturally motivated idioms

26. Стрелян заек 'a man of experience' (lit. "a shot-at hare")

27. Парен каша духа *once burnt/bitten, twice shy* (lit. "once burnt by porridge, you blow on it")

28. Гладна мечка хоро не играе *hungry bellies have no ears* (lit. "a hungry bear would not dance")

29. Свалям картите на масата *lay/put your cards on the table*

30. Убивам два заека с един изстрел *kill two birds with one stone* (lit. "kill two hares with one shot")

31. Виждам дъното на бутилка 'drink up the bottle' (lit. "see the bottom of the bottle")

32. Хвърлям топа *kick the bucket* (lit. "throw the cannon")

33. Храни куче да те лае *bite the hand that feeds you* ("feed a dog, to bark (on) you")

34. Трия сол на главата му *give someone's head a washing; to nag* (lit. "rub salt on one's head")

35. Попадам в задънена улица *fall in a blind alley*

36. Болен здрав носи 'the one who is supposed to be helped is doing the work' (lit. "the sick carries the healthy")

37. Излизам от строя *get out of order* (lit. "get out of the line")

38. Изхвърлям някого през вратата *throw someone out by the door; kick s.b. out*

39. Разпъвам на кръст някого *crucify*

40. На края на света *at the black of beyond; in the middle of nowhere* (lit. "at the end of the world")

41. Играем си на криеница *play hide-and-seek*

42. Падна ми камък от сърцето *a stone fell from my heart*

43. Хвърлям прах в очите *blear someone's eyes* (lit. "throw dust into the eyes")

44. Всеки ден не е Великден *every day is not a Sunday* (lit. "every day is not Easter")

45. Като гръм от ясно небе *a bolt from the blue* (lit. "like a thunder from clear sky")

46. Роден под щастлива звезда *born under a lucky star/ with a silver spoon in one's mouth*

47. Работи без да подвие крак 'work without rest' ("work without twisting/ bending a leg")

Instructive idioms

48. Който се захваща с много работи не свършва нито една *he who begins many things, finishes but few*

49. Захванало се пилето да учи кокошката как се снасят яйца 'to try to tell or show someone more knowledgeable or experienced than oneself how to do something' (lit. "the chicken set to teach the hen how to lay eggs")

50. По-добрите плувци по-често се давят 'Even skilful and trained people get into trouble, if they are not careful and reasonable' (lit. "Good swimmers drown more often")

51. Не слагай всички яйца в една кошница *don't put all your eggs in one basket*

52. Вади си вода от новия кладенец, но не плюй в стария 'one should respect things that have served him, because he may need them again' (lit. "you may pull water from the new well, but never spit in the old one")

53. Който си пази старите дрехи спечелва и нови *and a penny saved is a penny earned* (lit. "he who saves his old clothes, earns new ones")

54. Който хвърчи високо, пада низко 'overrating one's faculties or virtues can lead to bad results' (lit. "he who flies high, falls crashing down")

55. Който не работи, не трябва да яде *he who does not work shall not eat*

56. Седем пъти мери, един път режи *measure twice and cut once* (lit. "measure seven times, and cut once")