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Coining Compounds and Derivations – A Crosslinguistic Elicitation Study of Word-Formation Abilities of Preschool Children and Adults in Polish and English[1]

This paper examines word-formation abilities in coining compounds and derivatives in preschool children and adult speakers of two languages (English and Polish) differing in overall word-formation productivity and in favoring of particular word-formation patterns (compounding vs. derivation). An elicitation picture naming task was designed to assess these abilities across a range of word-formation categories. Adult speakers demonstrated well-developed word-formation skills in patterns both typical and non-typical for their native language. In contrast with adult results, preschool children predominantly coined innovations conforming to the general pattern of their language: Polish children favoring derivation and American children favoring compounding. The results show that although children are improving their word-formation skills during the preschool years, they need much more experience to come to the mature proficiency in using the variety of word-formation patterns available in their language.

Key words: *lexical coinages, derivatives, compounds, word-formation development, preschool children, cross-linguistic comparison*

Children are very effective word learners. Starting to speak about their first birthday, they soon acquire hundreds of new words, often after very limited exposure (Bloom, 2000, 2004; Carey, 1978; Carey & Bartlett, 1978; Clark, 2009). After breaking the code: understanding the basic, symbolic nature of words and discovering how relating sounds to meaning works (McShane, 1980; Naigles, 2002), the world of words is open and widely exploited by children.

However, children not only learn words present in the input language; they can also create new words on the basis of that which they already know. They can produce new word forms, inflected words, which is especially important and in fact indispensable in inflectional (e.g., Slavic) languages where each word/lexeme may occur in speech in several or even a dozen or so forms (with inflectional affixes/endings) depending on its role in the sentence. But this capacity although acquired early in inflectional languages (Dressler, 2004; Neimi & Niemi, 1987; Smoczyńska, 1985) does not lead to an expansion in the new lexeme repertoire. However, children are also able to coin new lexemes from the old ones and this is the process which can in effect increase their vocabulary or at least can contribute to the ability to deal with word shortages in certain situations, by filling semantic gaps with new coinages (Clark, 1993, 1995, 2009). The process involves learning word-formation rules

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present and productive in the first language and results in usage of new complex words derived or compounded from known morphologically simple (or simpler) words. There is much evidence from natural speech samples (speech diaries, collections of new coinages) that children are capable of creating new complex words very early on (even before age of two years) in many languages (Chmura-Klekotowa, 1971; Clark, 1993, Czukowski, 1962). However, systematic experimental studies reveal that under controlled conditions children's coinages can be restricted to specific categories (Berko, 1958; Clark, 1993; Clark & Berman, 1984; Derwing & Baker, 1986), while at least some word-formation (predominantly derivational) tools cannot be fully mastered until children are at least of school age (Aitchison, 2000; Anglin, 1993; Berman, 2004; Ravid, 2004; Tyler & Nagy, 1989).

It is not clear what limits preschool children's productivity in word-formation under experimental conditions. Possible explanations relate to the generality of rules underlying their spontaneous coinages. Coining a word in a given linguistic and situational context can be based on low-level (one-to one) analogy, use of a partial scheme or a general rule (Berman, 2000, 2004; Chmura-Klekotowa, 1971; Clark, 1982, 2000; Dąbrowska, 2006). Eliciting coinages in a minimal-context (i.e., experimental) situation may require higher level (general rule) rather than low-level operations. Eliciting new words can be also connected with the child's level of linguistic awareness since prompts in elicitation tasks often directly tap into the process of naming ("What would you call x …?"; Berko, 1958; Clark & Berman, 1984; Duncan, Casalis & Colé, 2009) which makes the task more difficult and demanding (Berman, 2000). Aitchison (2000) relates the ability to coin a wide variety of complex word types to vocabulary size, situating the "critical mass" for word-formation productivity at 20000 items in one's lexicon (achieved by English speakers above age of 12 years). This suggests that before this stage, English-speaking children/adolescents have too few examples of complex words in their repertoire to be able to extract/form general rules for new word forming. Late productive use of some word-formation devices is also being related to formal schooling and the process of reading development when some (especially abstract) terms can be experienced by learners only in written form (Nagy, 2007; Ravid, 2004).

Lexicons of all languages are evolving; some words are dropped and others are coined during natural language changes (Aitchison, 2001). Although the division of open-closed class words is based on the assumption that open-class categories can adopt a potentially infinite number of new members (while closed class categories, being predominantly grammatical morphemes, are impervious to newcomers), it is quite rare that new words are totally unrelated to already existing ones (Bauer, 1983; Plag, 2003). Most new words are formed on the basis of old words and they follow patterns of word-formation present in a given language. Thus, forming a new word usually mean coining a complex word consisting of a base (simplex) or bases and some formal elements linking the bases or changing their meaning according to underlying rules. These patterns are claimed to be rules of word-formation.

However, languages differ significantly in the extent to which they exploit word-formation in general and in the types of word-formation devices which they most frequently adopt in particular (Aitchison, 2003; Clark, 1998). For example, English, which in general has a relatively less productive word-formation system, prefers compounding (forming new complex words by linking two roots in one word, e.g., *air-port*) (Bauer, 1983; Lieber, 2005) while Polish favors derivation (forming new words by adding affix(es) to one root, e.g,. *lotn-isko* – Polish word for airport formed by attaching suffix *-isko* to root *lot(n)*, where the suffix has a general meaning "place for" and the root means "flight/to fly") (Grzegorczykowa & Puzynina, 1998; Jadacka, 2001; Nagórko; 1998).

Standard complex words which are present in the language may be acquired without any analysis of their internal structure (Clark, 1993). Thus children's lexical innovations which are consistent with patterns of standard complex words formation, e.g., using an affix (in derivations) or prosodic pattern (in English noun-noun compounds) are treated as strong evidence for the ability to access this structure. In children's spontaneous speech they reflect to some extent the process present in adult language since new complex words are constantly being coined in everyday adult language (Fischer, 1998, for English; Jadacka, 2001, for Polish). Children's coinages are well documented, although often not studied systematically (Clark, 1982, 1993; Chmura-Klekotowa, 1971; Haman, 2002) but rather quoted anecdotally (Czukowski, 1962; Strączek, 2009). Experimental studies focusing directly on crosslinguistic developmental differences and using a broad range of word-formation categories are still sparse (Clark & Berman, 1984, contrasting English and Hebrew; Duncan et al., 2009, contrasting English and French).

In our study we directly compare elicitations of Polish and American-English speaking preschool children on a variety of word-formation categories of complex nouns present in both languages. In particular we contrast various types of compounds typical for English (root and synthetic) and derivations typical for Polish (denominal and deverbal). We also varied semantic class within each type of complex words aiming at a wide comparison of various word-formational options. For establishing a potential ceiling, we also tested adult native speakers of Polish and English, showing how fully competent language users deal with the task presented to children. We were interested in how children approach the task of coining innovations within typical and non-typical (but existing) patterns available in their native langauge. We were also interested in

learning about what kinds of improvements they make during the preschool years, and in crosslinguistic developmental comparisons.

Word-formation Tools: Compounding and Derivation in Nouns

The grammatical category which comprises most complex words both in English and Polish is nouns (Grzegorczykowa & Puzynina, 1998; Plag, 2003), which can suggest that the process of forming new words in a language is mostly driven by the need to name new objects /entities (rather than new activities or features) (Jadacka, 2001). General productivity of word-formation in Polish is evidenced both by a variety of semantic categories of complex words and a variety of affixes used within and across these categories (Grzegorczykowa & Puzynina, 1998). For example a comprehensive electronic set of Polish dictionaries, Portal PWN (PWN, 2003), lists 184 affixes present in modern Polish. English, which also contains various word-formation patterns, seems to use them to a lesser extent and some linguists even claim word-formation in English is a peripheral phenomenon (Aitchison, 2003). English also contains a much smaller repertoire of affixes: 86 are listed on a comprehensive website inventory (English Language Roots Reference, n.d.; see also Crystal, 2003). The Great Multimedia English-Polish and Polish-English PWN-Oxford Dictionary (2006) lists just 48 affixes in English, but this list presumably is not complete. The difference between languages in number of affixes concerns mainly derivation; however, affixes are also used in synthetic compounds. Although English is a pro-compound language and Polish is a pro-derivative one, it should be also mentioned that due to political changes and the pervasive presence of English in everyday life in Poland during the last 20 years, a significant increase in compound coinages in adult language has been occurring in Poland (Jadacka, 2001). This process also involves predominantly noun coinages.

The fact that nouns are the most productive word class in word-formation together with the previous observations that they are present in children's spontaneous speech very early on in both Polish and English guided our decision to study noun coinages under experimental conditions in an elicitation task.

Since in our study we focused just on noun coinages, the subsequent sections describing compounding and derivation are restricted to the category of nouns only.

Compounding

Compounds are lexemes containing at least two stems. Classification of compounds distinguishes between root compounds and synthetic compounds. Root compounds are composed of two bare roots; in English most frequently these roots are two nouns (e.g., *schoolbag*) in which the second (righthand) stem is a head and the first one is a modifier. In contrast synthetic compounds involve always a verb as one stem and typically require a derivational suffix as well (e.g., *firefighter, can-opener*) (Berman, 2009; Lieber, 2005). Formations in which the verbal root is accompanied by the suffix and form together with it the compound head (in a righthand position as in root compounds) are most productive in English (Bauer, 1983; Lieber, 2005). Such compounds reflect the argument structure of the verb used in the formation. The other base word, usually a noun, is an object argument (e.g., a dogcatcher is someone who catches dogs).

In Polish, compounding is much less productive than in English and in particular, formations involving two nouns are rare although possible (e.g., *barakowóz, płucoserce*). Nominal synthetic compounds in Polish can consist of a verb plus noun or adjective or pronoun or numeral. Noun plus verb plus suffix constructions are fairly productive in modern Polish although only with a limited range of verbs (e.g., *prac-o-daw-ca*, *work-giv-er /employer; *usług-o-bior-ca*, *service-receiv-er / consumer) (Jadacka, 2001). In contrast to English, compounds in Polish almost always require a linking formant, interfix *-o-* (*barak-o-wóz*). Formations without the interfix are called closed compounds and do not usually involve two nouns but rather combinations of adjectives or verbs and nouns (e.g., *Wielkanoc*, *Great night – Easter) and are rare in the language.

Derivation

Derivatives are words derived from one stem (base word) by attaching to them bound morphemes: affixes. Both prefixes (morphemes attached to the beginning of a base word, e.g., *dis-comfort*) and suffixes (affixes attached to the end of a base word, e.g., *write-er*) can be used to form derivatives. In the process of derivation the grammatical class of word can be preserved or changed. In both English and Polish derived nouns can be created from all other word classes and from nouns as well. Forming nouns from nouns is particularly productive in Polish, especially in the case of child directed speech (CDS) since Polish is one of the languages in which diminutives are very frequently used in CDS and in child language as well (Dąbrowska, 2006; Haman, 2003) with a wide range of suffixes among which *-ka*, *-ek*, and *-ko* (grammatical variants for feminine, masculine and neutral genders) are most productive. In English, diminutives are possible to be formed but not used very frequently in any register including CDS (Clark, 1993). The most common suffix used in diminutive forms in English is *-y/ie*, e.g., *dog - doggie, mom – mommy*.

Other categories of nouns formed productively from noun bases in Polish are (among others) feminine nouns formed from masculine names for people (e.g., *student-*

MASC vs. *studentka*FEM), augmentatives/expressives (*dom – domisko* / house – big or horrible house) or names for young creatures (*kaczka – kaczątko* / duck-duckling) (Grzegorczykowa & Puzynina, 1998). In English, forming of feminine-derived forms of names for people is also possible (e.g., *prince – princess*), and names for young creatures are formed with use of two suffixes: *-let* or *-ling* (e.g., *piglet, duckling*) but derived augmentatives can be formed in English only by prefixation (e.g., *super-man*) sometimes being interpreted as compounding (Lieber, 2005).

Nouns formed from verbs via derivation are a wide group of complex nouns in both Polish and English. They can have various meanings usually depicting one of possible arguments in the argument structure of the base verb (e.g., English: *to train – a trainer; a trainee*; Polish: *czytać – czytelnik, czytanka* / to read – a reader, a reading text) or being names of an activity, process or event (*to train – a training; to arrive – arrival; to prefer – preference*). In both languages agent and instrument nouns are two of the most frequent and productive derivational categories. These two categories were studied extensively in child English and have been found to be present in spontaneous speech from 2 years of age (Clark, 1993); in experimental comprehension studies from age 3 (Clark & Hecht, 1983) and a year later in production studies (Clark & Hecht, 1982), with the consistent pattern of coinages for agent nouns being present earlier than instrument nouns in English language. They are also early and frequent coinages (from age of 2) in Polish as attested by speech diary analyses and experimental elicitation studies (Chmura-Klekotowa, 1967, 1968, 1971; Haman, 2000). The crosslinguistic difference between languages studied here is that in English there are just a few suffixes to be used in these categories among which *-er* is the most frequent and almost the only present in children's speech (Clark, 1993, Clark & Hecht, 1982). Polish has several different suffixes used for each of the two categories and most of them are exploited in spontaneous speech (e.g., *-acz, -ak, -ik -nik* for agents; *-ek, -ec, -dło* for instruments; Chmura-Klekotowa, 1971).

Thus when choosing a set of categories present in both languages which could be tested as representative of overall word-formation system and possible to be examined in preschool children we decided to include in our study prompts to elicit derivatives (i.e., diminutives, names for young creatures, deverbal names for instruments and agents), and prompts to elicit root and synthetic compounds involving noun + noun or verb + noun pairs. These categories will be addressed in more detail in the section describing the lexical materials used in the present study.

The Present Study

Our aim was to explore cross-linguistic differences in the development of both typical (productive) and non-typical (less productive) word-formational patterns. We studied Polish and English-speaking children's ability to coin innovative complex nouns since these languages differ in their preference for compound and derivative formations. We sought to examine how preschool-aged children start to use a variety of constructions which are typical/non-typical for their native language and how they cope with the situation requiring non-typical construction. No previous direct comparisons of that kind for Polish and English are available. The only direct controlled crosslinguistic experimental study concerning production of complex words in preschool children is that of Clark and Berman (1984). Clark and Berman assessed only production of agent and instrument nouns in English and Hebrew and did not contrast compounding and derivation as a factor manipulated by specific wording of a prompt although both types of coinages were analyzed. It was found that English-speaking children were able to produce compounds earlier (from age of 3 years) in development than Hebrew children, who preferred constructions based on one lexeme and started to use compounds at about age 5. In our study we expected a similar difference in preference for derivative and compound constructions but for a wider range of word-formational categories. We were also interested whether children would be sensitive to different types of prompts (promoting compounding vs. derivation), adjusting their performance to specific prompt wording (presence of two vs. one potential base word within the prompt) even if it contradicted the pattern dominating in their native language.

Method

Design

We decided to design a picture naming elicitation task involving formation of both derivatives and compounds. This task was used in two nearly identical experiments: one with adult native speakers of American English and of Polish (Experiment 1), and the second with children of two age groups: 3 and 5 year olds acquiring American English or Polish, taking part in a larger study of mother-child conversations and narratives[1] (Experiment 2). Since the experiments were nearly identical we will present the design of both studies in parallel, highlighting the differences when needed.

Participants

A total of 35 persons were tested in Experiment 1. All adult participants were university undergraduates. There were 17 American students (4 male and 13 female) and 18 Polish students (11 male and 7 female).

[1] „Cross-Cultural Examination of Parent-Child Narratives and Conversations" - Twinning grant from National Academy of Sciences no 47.075 (principal investigator Dr. Andrea Zevenbergen).

Table 1. Distribution of Participants According to Age and Gender in Experiment 2

	American			Polish		
	Girls	Boys	Total	Girls	Boys	Total
3 year olds	10	9	19 (43.0/3.2)	8	10	18 (41.5/4.03)
5 year olds	10	13	23 (62.9/2.7)	12	12	24 (65.3/4.4)
Total	20	22	42	20	22	42

Note. Mean age and standard deviation in months for each age group are given in parentheses.

A total of 84 children (42 American and 42 Polish children) took part in Experiment 2. Children were divided into two age groups: 3 and 5 year olds. Distribution of age and gender is listed in Table 1, together with the mean age of each group. Children were recruited for a larger project (mentioned above). Families were contacted via preschools and newspaper advertisement. Strict criteria for mothers' education and area of residence were adopted to facilitate similarity across samples. All children in Experiment 2 had mothers with at least 3 years of college education and were living in suburban or rural areas. This requirement resulted in including in the study only children of generally well-educated and well-off families.

Much effort was put into balancing the groups across languages for age. There were no significant differences in age between the two groups of 3 year olds; $t(35) = 1.26$; $p > 0.21$). However, it happened that the American 5 year olds were slightly younger than Polish ones ($t(45) = 2.15$; $p < 0.04$). This was due to the differences in the educational systems across the USA and Poland. The age in which children enter kindergarten in the USA is earlier than in Poland; thus, we had a chance to recruit only younger 5 year olds (up to the age of 69 months) in the USA, while in Poland 5-year-old children from the full age range (60-71 months old) were available. In the results section, we will discuss this issue in more detail.

Lexical Material

The task was comprised of 32 prompts which were varied and balanced according to several criteria:

(1) Compounding vs. derivation
Half of the prompts were designed to elicit derivatives, half to elicit compounds.

(2) Grammatical class of base words
Half were nouns and half were verbs (in case of derivatives), half were pairs of nouns and half were noun-verb pairs (in case of compounds).

(3) Semantic class of potential coinage
To account for general differences in development of word-formation patterns (operationalized here as a type of prompt) we decided not to restrict the material used for each pattern to one semantic category only (e.g., just instrument nouns or just diminutives). Thus each subtype of prompt comprised two semantic classes of potential coinages, e.g., prompts for coining derivatives from nouns included names for small things (e.g., *dagot – small dagot/*dagottie*) and for young creatures (e.g., *soga – *sogalet*); prompts for coining derivatives from verbs included names for agents (e.g., *to keef – *a keefer*) and names for instruments (e.g., *to sipe –* a siper*); prompts for coining compounds from noun-noun pairs included names of things "made for something"– being a subclass of a head noun defined by a function "to be used for an object" (e.g., plate for bananas – **banana-plate*) and names of things "made of something" – being a subclass of a head noun defined by material "used in producing an object"(e.g., hat made of grass - **grass-hat*); prompts for coining compounds from noun-verb pairs included names for instruments for performing an action: in half of prompts the questioned object was called "something special for ….(doing something)"(e.g., something special for chopping onions - **onion-chopper*), in the other half of the prompts, the target object was called "a machine for …(doing something)" (e.g., a machine for digging a tunnel – **tunnel-digger*).

The task comprised both nonce words and real words. Introducing nonce words makes the task more demanding (Clark, 1993) so we decided to use nonce words only for derivations (where just one word is given as a base for an innovative complex word). In prompts eliciting compounds we used real words. Using nonce words in these prompts could be too challenging in terms of working memory for preschool children. On the other hand, using real words for at least some of the categories involved in pro-derivative prompts (i.e., diminutives) would make it impossible to classify Polish children's answers as innovative since these categories are so productive in Polish that

potentially all nouns can be used in diminutive form in standard language.

The full design with all nonce word and real word pairs is presented in Appendix A. In general four types of prompt were used: two pro-derivative and two pro-compound types. Pro-derivative prompts were further differentiated by the potential base word (noun vs. verb); similarily pro-compound prompts were differentiated by potential pairs of base words (noun + noun vs. noun + verb). The whole task comprised 32 items: 4 items in each of 2 semantic categories of potential coinages, in each of 4 types of prompts.

The task was therefore not fully balanced since in pro-derivative prompts only nonce words were used and in pro-compound prompts only real words were used. We considered this as a necessary compromise for not making the overall task too difficult and to have a chance of observing real innovations in all categories.

All nonce words were phonetically acceptable in both English and Polish. After choosing 16 nonce words (stems) they were randomly assigned to categories used in the experiment. Nonce words used as nouns were bi-syllabic (half ended with *-a*, and half ended in a consonant in order to balance the phonetic shape of typical feminine and masculine nouns in Polish which has grammatical gender marked on every noun). Nonce words used as verbs were one-syllable words (in Polish when obligatory verbal ending/inflections were added the words actually become tri-syllabic. We wanted to avoid usage of words longer than three syllables and thus did not match the length of words between the noun and verb base conditions).

All real words used in pro-compound prompts were selected so that they did not form standard compounds in either English or Polish. In doubtful cases during the process of word selection, Polish and English dictionaries were consulted.

Pictorial Material

Pictures for prompts were drawn by an artist experienced in children's illustrations. They depicted: (1) unknown inanimate or animate objects (for diminutives and names for young creatures elicitation), (2) persons performing unknown actions (different kinds of gymnastic figures) and persons performing an action with unknown instruments (for elicitation of agents and instruments names), (3) strange but known objects made of some material or made to suit some other known object (for eliciting noun-noun compounds), (4) unknown tools performing an action (named with standard verbs) with use of known objects (for eliciting noun-verb compounds). All pictures were two-part: on one side of the chart (A4 size) one base word object/action was presented while on the other, the second base word (in case of pro-compound prompts) or target unknown objects (in case of pro-derivative prompts) was shown (see Appendix B). For example for the "grass-hat" item some grass was shown on the left side of picture and "grass-hat" was shown on the right side; for tobel item, a big tobel was presented on the left side of the picture and a small one on the right. Left-right position of target object was balanced across all items. All pictures were perceptually organized in a similar way.

Procedure

Permission to conduct the study was obtained from Human Subjects Review Committees. Prior to the study beginning written consent was obtained from adults in Experiment 1. Also written parental consent as well as child assent was obtained in Experiment 2.

Generally, the procedure in both experiments was nearly identical. Procedure description, introductory instruction and prompts were prepared in Polish and English simultaneously so any crosslinguistic discrepancies which occurred during the process were resolved immediately. We consider both language versions to be fully parallel and compatible.

Introductory instruction was adjusted to the age of participants. In Experiment 1 (adult participants), they were informed that they would see a series of 32 pictures with people, objects and actions. Every picture was accompanied by a short description and a question. Participants were told before the presentation of any stimuli, "Your task will be answering the question with just one word. This study is designed for children of preschool age. Thus the tasks can seem to be simple or monotonous. Please treat them seriously and answer all the items." In Experiment 2, the introductory instruction was: "We will look at pictures together in a moment. You will see different objects and people doing something. I will tell you a very short story about each picture and then you will give it a name. Some pictures can be a little strange. One word for each picture will be enough."

Then each participant was asked whether he/she was ready to start the task and presentation of pictures with prompts was begun. The wording of prompts in Experiments 1 and 2 was identical, with the exception of asking for nonce words repetition (see below). The exact form of prompts used for each category is presented in Appendix C.

There were no filler items used in the study as we considered this 32-item test at the maximum length for 3-year-old children to complete it during one session. Participants were presented with the experimental materials (32 items) in one of four quasi-random orders to avoid order effects (orders were balanced across age and gender groups). Orders were quasi-random (not just random) since we wanted to avoid sequential presentation of two or more items from one category in a row. Each order of presentation was constructed by the random ordering of

the eight categories and random ordering of four items within categories. Every item from a given category was followed by an item from a different category in an order determined by previous random selection. In this way four sub-lists of items (each item from a different category of prompt) were organized and together they formed one order. Thus, no two items from the same category could be presented in a row.

During the experiment the picture for a given prompt was shown first and then a verbal prompt was offered. For items where nonce words were used, we wanted to ensure that the children were able to pronounce the words; thus during the prompt they were asked to repeat the word in the form it was used by the experimenter. Before giving the testing question in each prompt (starting with "What would you call …?") one part of the picture (representing the base word) was hidden and only the target object to be named by the participant was visible. In this way, we wanted to ensure that the child knew she/he was asked to name only one object (e.g., only a small tobel or only a bed and not both a piece of sponge and a bed). This was particularly important in the case of the pro-compound prompts in English in which some compound constructions like "sponge-bed" can be superficially identical to naming two objects one by one (sponge and bed).

When study participants tried to answer using many words (e.g., describing objects) they were reminded (not more then twice during all the experiment) that a one-word response was enough. If no answer was elicited, only the part of last question of the prompt was repeated ("What would you call it?") without further repetition of the target base words.

All participants were tested individually. Adults (university students) were tested in a quiet room/psychological research laboratory at the university. Children taking part in Experiment 2 were tested either at their home, a public library or in a laboratory at the university. For them, the task analyzed here was the last task in a series of various activities lasting approximately 45 minutes (children were involved in mother-child free conversation and in mother-child co-narration on shared past events beforehand).

Child participants' answers were both recorded and written down on an answer sheet; adult answers were just written down on an answer sheet by an experimenter.

Data Coding

All answers – elicited words – given by participants were classified according to several criteria.

(1) Is the elicited word an innovation? All words not present in standard language were considered to be innovations. In doubtful cases, dictionaries were consulted with; even if the coinage was a very rare or specialized word and presumably not known to the child previously but existing in the language, it was not classified as innovative. Innovations could be complex words or new (nonce) words coined by the participant.

(2) Is the elicited word a complex word? A complex word could be a compound (including two base words) or derivative (including one base word stem and derivational affix).

(3) Is the elicited word related to any of potential base words? All words used in prompts were eligible as "potential base words." Some coinages could be based on words not present in the prompt at all.

(4) Is the elicited word a noun? Some answers given by participants could not be easily classified according to their word class (e.g., leling). Only unambiguous forms were considered as nouns.

Only innovative complex nouns elicited from at least one base word present in a prompt were considered in subsequent analyses. Words for which word class could not be definitely determined or were not nouns were excluded from analysis (e.g., *keefing*, if given without any syntactic context, can be both noun and verb). Innovations not related to any standard or nonce words given in prompts (i.e., coinages which can be interpreted as nonce words invented by the participant, e.g., *gonk*, *gome* for English; *oszmin*, *belak* for Polish) were also excluded from analyses. Novel complex words not related to any word present in the prompt were not considered as well. Thus the subsequent analyses deal with novel nouns coined from words present in prompts (in the following sections we will refer to them as to "coinages", "innovations" or "innovative coinages").

All answers were coded by one native speaker for each language and then a subgroup (balanced sample of 10 participants in each age/language group) by a bilingual speaker. The reliability of coding for three basic categories of codes (innovativeness; type of complexity: compound vs. derivative; relation to base words offered in the prompt) was assessed and found to average 0.94. All discrepancies were discussed in relation to above criteria and corrections were agreed upon.

Results

For the general statistical analysis, the total number of coinages as an indication of overall productivity in word-formation was counted for each participant.

Then the coinages were grouped into four groups according to the type of prompt eliciting them: pro-derivative prompts with noun base word (pro-DER-N); pro-derivative prompts with verb base word (pro-DER-V); pro-compound prompts with two nouns as base words (pro-COM-N+N) and pro-compound prompts with noun and verb bases (pro-COM-N+V). For each type of prompt, the

number of derivative coinages and number of compound coinages was summed for each participant. Comparison of derivative coinages for all prompt types (both pro-derivative and pro-compound) and a separate comparison of compound coinages for all prompt types enabled the assessment of manipulation effectiveness as well as participants' preferences for coining just one type of complex words (derivatives vs. compounds). For each participant, only the first coinage was taken into account; if someone delivered more than one, the subsequent coinages were ignored (participants were not encouraged to coin more than one word and thus production of additional coinages was in general rare).

To assess the statistical significance of revealed differences, non-parametric tests (Mann-Whitney *U*-test, Friedman's ANOVA and Wilcoxon signed rank test for paired samples) were performed when appropriate. Non-parametric tests were used because the data in both experiments did not satisfy the assumptions for parametric tests (e.g., number of innovations was not normally distributed).

Results for the two experiments are presented consecutively, with adults' data separated from children's data since differences between adult and children's performance on the task could hide any differences among children taking part in Experiment 2. Example of coinages created by adults and children who participated in our study are provided in Appendix D.

Results of Experiment 1

Adult data were obtained in order to show the full competence in word-formation skills in (American-)English and Polish speakers. Thus, an overall ceiling effect was expected in both language groups. In fact, in Polish the mean number of coinages was 30.95 (SD = 1.51) which is 96.7% of all possible innovative words (the maximum was set at 32 as the task included 32 items). In English-speaking adults, the mean was 26.41 (SD = 2.37), i.e., 82.5% of the maximum score. A Mann-Whitney *U*-test performed on this data revealed that this difference is significant (z = 4.47; p < 0.001). To find out whether this difference was related to a particular category or categories of prompts, Friedman's ANOVA was conducted on each language's data. Both for Polish and English data, Friedman's ANOVAs were significant (Polish: $\chi^2(3) = 17.1$; $p < 0.001$; English: $\chi^2(3) = 10.41$; $p < 0.016$). Thus within each language there were significant differences in the mean number of innovative coinages across the four categories of prompts. These data are presented in Table 2. A series of Wilcoxon signed rank tests (for paired samples) revealed that in the case of Polish this difference was exclusively due to the lower number of coinages in the category of pro-compound prompts with two real nouns being the potential base words (pro-DER-N+N) differing significantly from both types of pro-derivative prompts (pro-DER-N and pro-DER-V) (in both cases z = 2.52; $p < 0.012$). All other contrasts were not significant. In English, the difference revealed by Friedman's ANOVA was exclusively due to the higher number of innovations in the category of pro-derivative prompts with nonce verb base pro-DER-V (paired comparisons with pro-DER-N: z = 2.66; $p < 0.008$; with pro-COM-N+N: z = 2.43; $p < 0.016$; with pro-COM-V+N: z = 2.62; $p < 0.009$). All other contrasts were not significant. We can conclude that in Polish the only category which does not reach the ceiling score is the pro-compound type of prompt with two real nouns as bases (pro-COM-N+N), while in English the only category which does reach the ceiling score (or is close to) is the derivative type of prompt with nonce verb as base (pro-DER-V).

The analyses provided above does not reveal what kind of complex words (derivations vs. compounds) Polish vs. English speakers prefer to coin within each category of prompt specified; they show only the general effects of all (both derivative and compound) coinages. The next step is to show whether the manipulation used (differentiation among type of prompt) was successful not only in eliciting any coinages (as it was already shown), but whether it was effective in inducing particular types of coinages. Thus number of innovative derivatives and compounds was calculated for each participant within each of the four categories of prompts. These measures are interdependent since using a compound would prevent using a derivative and vice versa (just one answer for each item was expected from participants). Thus separate statistical analyses are provided

Table 2. Mean Number of Innovations in Experiment 1 in Polish and English

Innovations in a given type of prompt (maximum score = 8)	Polish	English
Pro-derivative (base word: nonce noun – pro-DER-N)	8.0	5.65
Pro-derivative (base word: nonce verb – pro-DER-V)	8.0	7.59*
Pro-compound (base words: two real nouns – pro-COM-N+N)	7.22*	6.71
Pro-compound (base words: real noun and verb – pro-COM-N+V)	7.72	6.47

Note. Means marked with asterisk are significantly different from other categories within same language – measured by Wilcoxon signed rank tests for paired samples.

Table 3. Mean Number of Derivative and Compound Coinages in Experiment 1 in Polish and English

Coinages in a given type of prompt (maximum score=8)	Polish		English	
	Derivatives	Compounds	Derivatives	Compounds
Pro-derivative (base word: nonce noun – pro-DER-N)	7.94	0.06	1.82	3.82
Pro-derivative (base word: nonce verb – pro-DER-V)	7.33	0.67	6.59	1.00
Pro-compound (base words: two real nouns – pro-COM-N+N)	2.06	5.17	0.06	6.65
Pro-compound (base words: real noun and verb – pro-COM-N+V)	2.94	4.78	0.23	6.23

for derivatives and compounds. The mean numbers of derivative and compound coinages in each language are given in Table 3. Again a series of Wilcoxon signed rank tests for paired samples was performed on these data (each column in Table 3). In Polish the manipulation was effective both in the case of compounds and derivatives. Polish speakers coined significantly more compounds with pro-compound prompts than with pro-derivative prompts (COM-N+N vs. DER-N: $z = 3.52$, $p < 0.001$; COM-N+N vs. DER-V: $z = 3.50$, $p < 0.001$; COM-N+V vs. DER-N: $z = 3.52$, $p < 0.001$; COM-N+V vs. DER-V: $z = 3.38$, $p < 0.001$). They also coined significantly more derivatives with pro-derivative prompts (DER-N vs. COM-N+N: $z = 3.62$, $p < 0.001$; DER-V vs. COM-N+N: $z = 3.52$, $p < 0.001$; DER-N vs. COM-N+V: $z = 3.72$, $p = 0.001$; DER-V vs. COM-N+V: $z = 3.51$, $p = 0.001$). However their use of derivatives in pro-compound prompts was not very low: means obtained for both pro-compound type of prompts show that in the COM-N+N category, derivatives comprised 25.75% of the maximum score, while in the COM-N+V category derivatives comprised as much as 35.75% of the maximum score (the difference between these two categories in derivative coinages is also significant: $z = 2.02$; $p < 0.05$). Thus we can conclude that even when the manipulation by prompt was effective in the sense that pro-derivative prompts resulted in significantly more derivative coinages than pro-compound prompts, still there is a tendency for derivation priority in Polish, which is manifested by a relatively high rate of derivative coinages in pro-compound prompts. Polish adults also successfully followed the compound pattern in pro-compound prompts: they coined significantly more compounds in these prompts than in pro-derivative ones. In this case there were almost no coinages against the pattern suggested in the prompt: in the DER-N category, an average of 0.06 compound coinages was produced (0.75% of the maximum score), and in the DER-V category an average of 0.65 compounds was produced (8.37% of maximum score). These numbers can be interpreted as a floor effect.

In English-speaking adults, there was a different pattern of findings. In the case of compound coinages the manipulation worked, in the sense that there were significantly more coinages in response to pro-compound prompts and the two types of pro-compound prompts did not differ in their ability to elicit innovative compounds. Paired comparisons for all four categories show significant effects for all pairs (COM-N+N vs. DER-N: $z = 3.39$, $p < 0.001$; COM-N+N vs. DER-V: $z = 3.57$, $p < 0.001$; COM-N+V vs. DER-N: $z = 3.39$, $p < 0.001$; COM-N+V vs. DER-V: $z = 3.46$, $p < 0.001$) except for COM-N+N vs. COM-N+V ($z = 1.07$, $p > 0.28$). However with pro-derivative prompts, English-speaking adults coined relatively many compounds, especially in the DER-N category, as the average percentage of compound coinages reached the level of 47.75%, almost half of the maximum score. Comparison of derivative coinages across categories in English-speaking adults revealed significant differences across all pairs of prompt types (DER-N vs. COM-N+N: $z = 2.37$, $p < 0.02$; DER-V vs. COM-N+N: $z = 3.62$, $p < 0.001$; DER-N vs. COM-N+V: $z = 3.05$, $p = 0.003$; DER-V vs. COM-N+V: $z = 3.62$, $p = 0.001$; DER-N vs. DER-V: $z = 3.20$, $p = 0.002$), except for two pro-compound types of prompts in which a floor effect was achieved (i.e., the average percentage of maximum score was 0.75% for COM-N+N and 2.87% for COM-V+N, $z = 1.22$, $p > 0.22$). Thus the conclusion that there is more derivatives in response to pro-derivative prompts is justified but nevertheless the low performance of English-speakers in the DER-N category (22.75% of maximum score) and especially the higher percentage of compounds in response to this type of prompt (47.75%) reveal that in this category the tendency for coining compounds was stronger than for coining derivatives in English-speaking adults. Explanation of this effect requires further scrutiny of this category and will be referred to later on in the discussion section.

We can conclude that in general the experimental manipulation of linguistic prompt (using different types of words as base words for nominal coinages) worked in adult Polish and English speakers. A ceiling effect was shown in the case of some Polish derivatives. Higher prevalence of derivation in Polish speakers was also shown, which is

Table 4. Number of Children Who Coined Innovations at a Given Frequency Level

Number of innovative coinages (frequency level)	American		Polish	
	Age 3	Age 5	Age 3	Age 5
0	6	0	5	1
1-8	10	3	10	4
9-16	3	15	0	5
17-24	0	3	2	7
25-32	0	2	1	7

in line with the assumption that Polish is a language preferring derivation over compounding. A higher number of compound constructions was shown for English-speaking adults although a ceiling effect was not revealed for this category. This can support the proposal that English is a compound-promoting language, but English is generally less productive in word-formation than Polish.

Results of Experiment 2

As mentioned already in the section on study participants, *t*-test revealed no age differences between 3 year olds across languages, but in the case of 5 year olds, the age difference was significant. Thus to ascertain if any subsequent potential language differences could be attributable to the difference in age (e.g., Polish children scoring higher than American ones) we performed a comparison of overall productivity (measured by number of all innovative coinages) within the Polish group of 5 year olds, dividing the group into two sub-samples: younger and older (12 participants each). Mann-Whitney *U*-test revealed no significant differences in the overall productivity across the two subgroups ($z = 1.62$; $p = 0.11$). In fact, the difference was in the direction of younger children scoring higher (x = 19.75; $SD = 8.2$) than older ones (x = 14.5; $SD = 8.9$). Thus any subsequent differences in task performance revealed across languages should not be attributed to the differences in the ages of 5-year-old children taking part in Experiment 2.

Overall word-formation productivity in children differed substantially from that of adults: 12 of all 84 participants (14.3%) did not produce a single innovational coinage. The maximum score was not reached at all and the highest obtained score was 30 coinages. The distribution of number of innovative coinages within each group is given in Table 4.

Chi-Square test performed on these data (all cells were increased for calculations by adding 5 to avoid zeros) revealed significant difference between the actual and expected distributions ($\chi^2(12) = 24.99$; $p < 0.015$). Thus, the distribution of scores was potentially influenced by either language or age differences (or both). Next two Chi-Square tests performed for each language revealed a significant effect in the American group ($\chi^2(4) = 10.39$; $p < 0.034$) but not a significant effect in the Polish group ($\chi^2(4) = 7.12$; $p > 0.12$). American 3-year-old children were less productive in word coinage than American 5 year olds. No one in the younger group exceeded 50% of the maximum score. On the other hand, Polish children revealed greater variability within each age group: 3 out of 18 in the younger group and most (14 out of 24) in the older one scored above the 50% threshold.

Subsequent analyses were aimed at uncovering whether there were developmental and crosslinguistic differences in children's types of coinages (compounds vs. derivatives) in particular categories of prompts (results are presented in Table 5).

First a series of Wilcoxon signed rank tests was performed to reveal whether the children were sensitive to the differences in types of prompts (promoting derivation or compounding) in Polish and English. The expected pattern of a higher number of derivative coinages in pro-derivative prompts and higher number of compound coinages in pro-

Table 5. Mean Number of Derivative and Compound Coinages in Experiment 2 in Polish and English 3- and 5-Year-Old Children

Coinages in a given type of prompt (maximum score=8)	Polish				English			
	Derivatives		Compounds		Derivatives		Compounds	
	Age 3	Age 5	Age 3	Age 5	Age 3	Age 5	Age 3	Age 5
Pro- DER-N	1.17	3.33	0.33	0.83	0.05	0.48	0.58	2.52
Pro- DER-V	1.94	5.75	0.00	0.08	0.53	2.65	0.26	0.52
Pro-COM-N+N	0.78	2.75	0.06	0.33	0.00	0.09	0.74	4.78
Pro- COM-N+V	1.39	3.75	0.06	0.29	0.32	0.22	0.53	2.39

Table 6. Results of Mann-Whitney *U*-tests for Polish and English, Performed on Number of Derivatives and Number of Compounds, Contrasting the Two Age Groups in Each Category of Prompt

	Sum rank age 3	Sum rank age 5	*U*	*p*
		Polish compounds		
Pro- DER-N	341.0	562.0	170.0	0.242
Pro-COM-N+N	362.5	540.5	191.5	0.533
Pro- DER-V	378.0	525.0	207.0	0.819
Pro- COM-N+V	362.5	540.5	191.5	0.533
		Polish derivatives		
Pro- DER-N	293.0	610.0	122.0	0.017
Pro-COM-N+N	291.0	612.0	120.0	0.015
Pro- DER-V	241.0	662.0	70.0	0.001
Pro- COM-N+V	266.0	637.0	95.0	0.002
		English compounds		
Pro- DER-N	292.5	610.5	102.5	0.003
Pro-COM-N+N	225.5	677.5	35.50	0.001
Pro- DER-V	382.5	520.5	192.5	0.511
Pro- COM-N+V	276.5	626.5	86.50	0.001
		English derivatives		
Pro- DER-N	381.0	522.0	191.0	0.487
Pro-COM-N+N	399.0	504.0	209.0	0.810
Pro- DER-V	307.5	595.5	117.5	0.010
Pro- COM-N+V	406.0	497.0	216.0	0.949

compound prompts was not found in any of age/language groups. While particular categories of prompts were significantly different from other categories for a given age/language group, no overall systematic difference for pro-DER vs. pro-COM in number of derivatives or compounds in either of the age/language groups was revealed. In particular in Polish 3-year-old children the only pair of categories which differed significantly in derivative coinages was pro-DER-V vs. pro-COM-N+N ($z = 2.52$; $p < 0.02$). In Polish 5 year olds, pro-DER-V was significantly different from all three other categories (for comparison with pro-DER-N: $z = 3.32$; with pro-COM-N+N: $z = 3.88$; with pro-COM-V+N: $z = 3.42$; all $p < 0.001$). Similarly in English the pro-DER-V category was significantly different from others in both age groups (for all pairs, z always above 2.9, $p < 0.005$). There was also one distinctive category in compound coinages in English-speaking 5 year olds: this was the pro-COM-N+N category which differed significantly from the other three categories (for all pairs, z always above 2.9, $p < 0.005$).

Polish children from both age groups favored derivatives irrespectively of category of prompt. English-speaking children favored compounds in response to three out of four types of prompts. In pro-DER-V prompts (eliciting instrumental and agent nouns) they were coining more derivatives than compounds. Thus, language specificity (general favoring of derivations or compounds) was a more powerful factor influencing the child results compared to the particular type of prompt aimed at eliciting specific kinds of complex words.

Second, to account for developmental changes, a series of Mann-Whitney *U*-tests comparing the two age groups in each category of prompts in each language was performed (Table 6). In Polish the changes were very consistent: no significant improvement in any category of prompt was made when coining compounds from age 3 to 5, but the number of derivatives coined increased significantly with age for every category of prompt. In English children were increasingly coining compounds in three out of four categories. The only category with no significant improvement in number of compounds was the pro-derivative category with a verb base word, which at the same time was the only category in which derivative coinages increased significantly with age in this language group. Thus, English-speaking children improved their compound coinages with age and were also more productive in coining deverbal derivatives in the older group (compared to the younger one). However it is worthy to note that the mean score for English-speaking children aged 5 in this category was at about the same level as in Polish children aged 3 while the mean score of Polish 5 year olds exceeded significantly that of English-speaking 5 year olds in this category (Mann-Whitney *U*-tests for pro-DER-V: Polish 3 year olds vs. English-speaking 5 year olds, $z = 1.01$, $p > 0.31$; Polish 5 year olds vs. English 5 year olds: $z = -3{,}43$, $p < 0.001$).

Discussion

The presented experiments conducted with adults and preschool-aged children were aimed at highlighting cross-linguistic differences in productivity of word-formation patterns across various categories of complex words. Participants were expected to coin new nouns given four type of prompts: promoting derivatives or compounds, from either a base noun/two nouns or from verb/noun-verb pairs, representing various word-formation patterns. Only Polish adults showed an overall ceiling effect in coining innovations: they coined an average of 96.7% of all possible innovations. English-speaking adults also scored high but with greater variability (mean = 82.5%). While Polish adults scored significantly lower in only one category of prompts (the pro-compound prompt with two base nouns; 90.25%), English-speaking adults approached a ceiling in only one category (pro-DER-V: 94.9%). The lack of ceiling effect in English-speaking adults can be explained by their tendency to deliver not only word coinages but also phrases as answers to prompts. Even if they were asked to answer with "just one word" they occasionally used phrases. Polish adult speakers seem to be much more strict with their answers. We can speculate that Polish, being more productive in word-formation than English, triggers a tendency to coin a word rather than a phase whenever it is possible. However, in both languages, participants were able to coin effectively different types of derivatives and compounds, adjusting in general their performance to the type of prompt (promoting derivatives or compounds). The only category of prompt for which this conclusion cannot be fully applied in Experiment 1 is the pro-DER-N category in English where more compounds than derivatives were coined. This can be, however, accounted for by considering the specific wording in the prompts of two sub-types of items used in this category. The category was comprised of two semantic classes of potential coinages: diminutives and names of young creatures (see Appendices A & C). Both classes of complex words have established derivational patterns in English and Polish (e.g., English: *tobel-y*; Polish: *tobel-ek*: small tobel; English: *soga-let*; Polish: *soga-lątko*: young soga). However, when designing the prompts, we were aware that in Polish it is much more common to use word "small" ("mały") in a phrase eliciting the target word for young creatures than to use the word "young" ("młody"), especially in the case of child-directed speech. Thus we decided to use a phrasing of "this soga is a baby" rather than "this soga is young." In that way we delivered two nouns (*soga* + *baby*) instead of just one noun in the pro-derivative prompt making it very similar to pro-compound prompts. English-speaking adults were very sensitive to this difference and coined compounds like *soga-baby* massively in this category. Interestingly, this inconsequence in prompt wording had no effect on Polish adults – they still highly preferred derivatives.

An entirely different picture is revealed by the children's data. First children were much less productive in overall coining starting from an average of 9.4% (English-speaking 3 year olds) or 17.8% (Polish 3 year olds) of all possible innovations and reaching only a level of 42.6% or 53.5%, in 5 year olds from the USA and Poland, respectively. Additionally, children preferred language-general patterns (derivation in Polish and compounding in English) rather than being sensitive to the patterns suggested in prompts. Significant improvement with age was shown only for categories more prevalent in a given language. In the group of Polish children the developmental effect was obtained only for derivative coinages irrespectively of the type of prompt. English-speaking children improved in the number of compound coinages with age. The only exception in this language group was the pro-DER-V category of prompt which elicited more derivative than compound coinages and showed significant improvement with age. This can be explained by a particularly salient pattern for derivative instrument and agent noun-forming in English (using the suffix *-er*). Thus even if English can be seen as a compound-promoting language, one particular productive derivative pattern can be already present in children's elicitations at the age of five, which confirms previous findings of Clark and Hecht (1982). Interestingly, English-speaking adults showed a ceiling effect for just this category of prompt which confirms that this derivational category is particularly productive in English.

In our study, English-speaking children (similarly to English-speaking adults) were more willing to coin compounds in the pro-DER-N category of prompt – again due to the "young creatures" category using *soga-baby*-like constructions. Thus even if a derivative pattern is available in a language, a cue for compound formation (delivering two nouns in a prompt) was more influential, as forming compounds is generally more common in English. Interestingly, Polish children were not very productive with derivatives in this category showing a slight tendency to coin compounds as well, although this did not happen in Polish adults. Coining compounds like *soga-dziecko* (soga-baby) in Polish can be seen as non-canonical formation and Polish adults seemed to be aware of this. It is however the case that a general trend of incorporation of English type N+N compounds into modern Polish can be observed (Jadacka, 2001). We can speculate that when faced with a "canonical task" of word coining, Polish adults seem to go rather for traditional, well-established patterns, while children are more influenced by ongoing change in the language.

In our analysis we aimed to show general patterns present in the data gathered and account for crosslinguistic and developmental changes. However, the type of analyses we have chosen for this goal hides individual differences among participants. Thus when observing general patterns we cannot ascertain to what extent individual children follow these patterns. The ceiling effect in Polish adults guar-

antees that in this group individual variation is very small, but all other groups under scrutiny revealed considerable variation in result. In children, almost every age/language group included a minimum score of zero (no innovations in any of categories studied) for at least one participant. Some Polish 5 year olds reached a score as high as 93.75%. This variability can indicate that in fact children followed their individual paths to productive use of a range of complex words constructions. To explore this possibility further, analyses of individual use of particular constructions (as well as particular suffixes) within and across categories would be needed but go beyond the aims of this paper.

The gap between productivity in children and adults suggests an apparent question of when exactly children reach the level of performance similar to fully competent native speakers, which can be addressed empirically only by testing school-aged children. More specifically such a study could also reveal when children start to be sensitive to not only predominant patterns in their language but also to less productive word-formation constructions present in their language. Experimental studies in the development of word-formation during school age in English (Aitchison, 2000; Anglin, 1993), comparing English to other languages (French: Duncan et al., 2009) or in other languages (Hebrew: Berman, 2004; Ravid, 2004) provide evidence that the process of word-formation development is still ongoing until the late school age and is possibly related to literacy skills since some of word-formation patterns (at least in some languages) can be faced frequently only in the written register (Ravid, 2004).

This study was a first attempt at direct experimental comparison of preschool children's and adult speakers' productivity in word-formation in two languages promoting different types of word-formation (compounding vs. derivation) and also differing in word-formation productivity in general. We attempted to use various patterns of word-formation present in both languages to study the wide range of constructions present in both Polish and English and to show both the early and the final points of the developmental route. Further research on children in school age could show how and when these two points are meeting.

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Appendix A

Experimental design presenting conditions (type of word-formation construction, word classes of base words and semantic categories of words to be elicited) and listing all nonce and real words used in the study.

Type of Prompts word class of base word(s)	Base nonce words for derivatives		Base words for compounds	
noun//noun+noun	diminutives (names for small things)	tobel	sth (N) made for sth (N)	envelope – books
		loota		plate – bananas
		dugot		knife – eggs
		corda		shelf – candles
	names for young creatures	soga	sth (N) made of sth (N)	bed – sponge
		moojar		basket – sticks
		bleca		picture – seeds
		zalon		hat – grass
verb// noun+verb	names for agents	keef	sth special used for doing (V) sth (N)	catch – balls
		cren		cut – plants
		telt		melt – ice
		lel/ferk*		roll – rope
	names for instruments	kezz	machine used for doing (V) sth (N)	bend – cable
		wug		collect-apples
		sipe		chop – onion
		zem/dant**		dig – tunnel

N is used for noun; V for Verb; sth for something

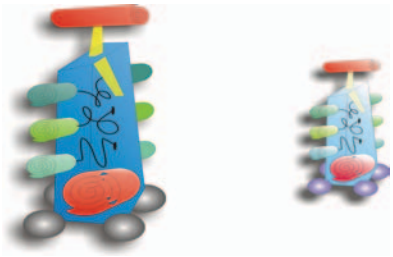
* the pseudo-word *ferk* was used for adults (Experiment 1) and then changed to *lel* in children study (Experiment 2) due to its phonetic similarity to an existing English rude word.

** the pseudo-word *dant* was used only for English-speaking adults (Experiment 1) and then changed to *zem* in Polish (both experiments) and English-speaking children (Experiment 2) due to its phonetic similarity to "dance" in English.

Appendix B

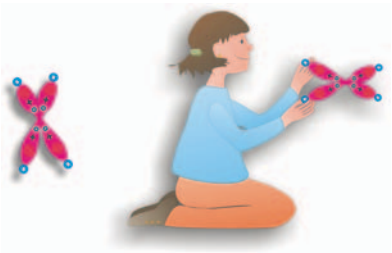
Example task items: pictures and sentences for some of categories of prompts used in the study); all pictures were in A4 size.

Pro-derivative prompt for coining diminutives



This is a loota. Here is another one, but this loota is different – it is a small one.
What would you call the small one so that we know this loota is small?

Pro-derivative prompt for coining instrument nouns

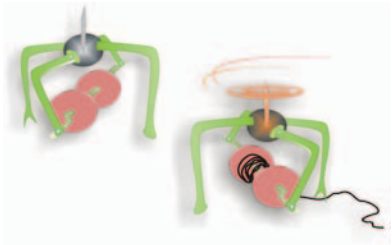


This is something special to kezz. Every one can use it to kezz.
What would you call it so that we know eveybody kezzes with it?

Pro-compound prompt for coining object names from two nouns

This is special knife used only for eggs.
What would you call it so that we know this knife is for eggs?

Pro-compound prompt for coining object names from noun and verb



This is something special used to roll a rope.
What would you call it so that we know people roll ropes with it?

Appendix C

Examples of prompts for each category of complex words to be elicited in English and Polish.

Pro-derivative prompts	
Diminutives (names for small things)	This is a tobel. Ⓟ Here is another one, but this tobel is different - it is a small one. What would you call the small one so that we know this tobel is small? To jest tobel. Ⓟ A tutaj jest drugi, ale ten tobel jest inny – ten jest mały. Jakbyś go nazwał, żeby było wiadomo, że ten tobel jest mały?
Names for young creatures	This is a soga. Ⓟ Here is another one, but this soga is different - it is a baby one. What would you call the baby one so that we know this soga is a baby? To jest soga. Ⓟ A tutaj jest druga, ale ta soga jest inna – to jest dziecko. Jakbyś ją nazwał, żeby było wiadomo, że ta soga jest dzieckiem?
Names for agents	This boy likes keefing very much. He keefs a lot. Ⓟ What would you call him so that we know that he keefs a lot? Ten chłopiec bardzo lubi kifować. On bardzo często kifuje. Ⓟ Jakbyś go nazwał(a), żeby było wiadomo, że on bardzo lubi kifować?
Names for instruments	This is something special for siping. Every one can use it to sipe. Ⓟ What would you call it so that we know everybody sipes with it? To jest coś specjalnego do sajpowania. Każdy może tego użyć, żeby sajpować. Ⓟ Jak być to nazwał(a), żeby było wiadomo, że tym się sajpuje?
Pro-compound prompts	
Sth (N) made for sth (N)	This is special envelope used only for books. What would you call it so that we know this envelope is for books? To jest specjalna koperta, używana tylko do książek. Jak byś ją nazwał(a), żeby było wiadomo, że ta koperta jest tylko do książek?
Sth (N) made of sth (N)	This is special bed made of sponge. What would you call this bed so that we know it is made of sponge? To jest specjalne łóżko zrobione z gąbki. Jak byś je nazwał(a), żeby było wiadomo, że to łóżko jest z gąbki?
Sth special used for doing (V) sth (N)	This is something special used for cutting plants. What would you call it so that we know people cut plants with it? To jest coś specjalnego, czego używa się do ścinania roślin. [To jest coś specjalnego, czym można ścinać rośliny.] Jak byś to nazwał(a), żeby było wiadomo, że tym się ścina rośliny?
Machine/tool used for doing (V) sth (N)	This is a tool used for bending a wire. What would you call this tool so that we know people bend wire with it? To jest narzędzie do zginania drutu. Jak byś je nazwał(a), żeby było wiadomo, że jego się używa, żeby zginać drut?

Note. Sign Ⓟ indicates when child participants were asked for nonce word repetition. N stands for noun, V for verb, "sth" for "something"

Appendix D

Examples of Adult and Child Coinages in English and Polish.

	Experiment 1 (adults)		Experiment 2 (children)	
	English	Polish	English	Polish
Pro-derivative prompts				
diminutives	minitobel	tobelek	minitobel	tobelek
(names for small things)	lootie	luteńka	babyloota	lutonka
	dugotis	dagocik	daggy	dagotinka
	cordetta	kordzia	smally	kordeczka
names for young creatures	babysoga	soguntko	babysoga	sogątko
	moojarette	mudżarek	babymoojar	mudżarek
	blecababy	blekuś	babybleca	bleczko
	zalona	zaloniątko	zalonbaby	dziecko-zalon
names for agents	keeflover	kifer	keefy	kifo
	crenner	kreniarz	crenboy	krenuś
	ferkizoid	ferkownik	leler	lelacz
	teltfanatic	teltolub	telter	teltowiec
names for instruments	siper	sajpowczyk	siperbouncer	sajparka
	dantinator	zemowajka	zemmerex	zamak
	wugelle	łagownica	wugger	łągowek
	kezz machine	kezownik	kezzerator	kezownio
Pro-compound prompts				
sth (N) made for sth (N)	bookenvelope	książkoperta	envelopebook	kopertoła
	bananaplate	bananierka	bananaplate	bananownik
	eggopener	jajkokrój	knifeegg	jajkowiec
	candlerack	świecpółka	candletable	świecopółka
sth (N) made of sth (N)	spongebed	gąbóżko	sponger	gąbkowica
	stickbasket	patykosz	woodbasket	patykowiec
	seedpicture	ziarnobraz	seedpicture	ziarenaczek
	grasshat	trawczapka	grasshat	czapniownia
sth special used for doing (V) sth (N)	ballcatcher	piłkołap	ballcatcher	łapiec
	plantchopper	roślinościnka	cutterplanter	ścinannik
	icemelter	lodotop	melterice	topnica
	rollroper	liniarka	ropemachine	linkacz
machine/tool used for doing (V) sth (N)	wirebender	zginodrut	bendwire	zginanka
	applemachine	jabłkolektor	applemachine	jabłkomaszyna
	onionchopper	cebulnica	chopperonion	siekań
	digmachine	tunelodrążka	tunneldigger	tunelko