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Cognitive development and humor processing in children – how knowledge on children’s capacity to detect and interpret humor can support the translator in the translation process

ABSTRACT

Cognitive development and humor processing in children – how knowledge on children’s capacity to detect and interpret humor can support the translator in the translation process

In my article, based on the research carried out by Jean Piaget and Paul McGhee (and others), I would like to focus on how children understand humor at different stages of their psychological development. Such knowledge on developmental psychology can turn out indispensable while translating humor in the literature devoted to children. Younger children will appreciate linguistic humor based on phonological ambiguity as they like playing with sounds. Early school children will recognize ambiguous word meanings and therefore will be able to enjoy semantic dimensions of the humorous texts. The theoretical part of the article will be supported by some examples of translations of wordplays from English into Polish and Portuguese in European and Brazilian versions taken from *Alice in Wonderland* by Lewis Carroll.

Keywords: humor, mind, translation, developmental psychology, children’s literature

Introduction

Translating for children requires various skills on the part of a translator. One of them is the ability to view the world from a child’s perspective to describe the reality in the translated text with the use of the language understandable for a young reader. In the case of humor translation in literary texts, knowledge on

children's capacity to detect and interpret humorous text parts at different stages of their cognitive development constitutes the basic requirement for successful translation understood as the one that produces laughter in a young audience.

As suggested by Hans J. Vermeer, the founder of the Skopos Theory supported by Katherina Reiss (2013) and also referred to by Christiane Nord (1977), translation is an action with a given purpose and for the purpose to be accomplished the translator should be "the expert in translational action" (Vermeer 2004: 228), which means that the translator knows well the area the translated text refers to as well as recognizes and takes into account the needs and expectations of the intended receiver of the translation while making translation decisions. Equipped with fundamental knowledge on developmental psychology, with the special emphasis on cognitive processes involved in humor appreciation by children, the translator is able to establish the age group the humorous literary text is directed at and apply suitable translation strategies and techniques adjusted to cognitive abilities of young readers.

The aim of this article is to outline general information on humor processing with the special focus on humor appreciation in children and demonstrate how such knowledge can influence translation decisions as to preserving the meaning and/or the sound of the humorous text parts in translation. Apart from references to psychological studies on humor, some aspects of brain anatomy and development will be mentioned in the article (to provide a more extensive view on the subject). The theoretical assumptions will be supported by some examples of humour in children's literature from English to Polish and Portuguese.

Humor and Mind

Humor detection and appreciation involves a set of mental processes undergoing in the human mind. They are based on the brain's ability to perceive and resolve incongruity, understood as a conflict between what is expected and what actually occurs in a joke/ a humorous context.

Rod A. Martin (2007) mentions two models based on incongruity resolution that treat humor comprehension as a kind of the problem-solving task. In the first model proposed by Thomas Shultz (1972):

the punch line of a joke creates an incongruity by introducing information that is not compatible with our initial understanding of the joke setup. This then prompts the listener to go back and search for an ambiguity in the setup that can be interpreted in a different way and that allows for the punch line to make sense (Martin 2007: 64).

The mind analyzes the incompatible information in the joke to find the resolution to ambiguity at various possible levels comprising phonological, lexical, syntactic or even non-linguistic aspects of humorous context. In the second model, elaborated by Jerry Suls (1972; 1983):

a joke setup causes the listener to make a prediction about the likely outcome. When the punch line does not conform to the prediction, the listener is surprised and looks for a cognitive rule that will make the punch line follow from the material in the joke setup. When this cognitive rule is found, the incongruity is removed, the joke is perceived as funny, and laughter ensues. If a cognitive rule is not found, however, the incongruity remains, and the joke leads only to puzzlement instead of humour (Martin 2007:64).

Thus, in the process of humor comprehension, the brain's activity is engaged in examining and juxtaposing different cognitive rules based on the previous experiences acquired by the joke's listener in order to find logical explanation, i.e., solution to the joke, if there is one.

Humor processing in the brain comprises two stages (Chan et al. 2012; Shultz 1972; Wild/ Rodden/ Grodd/ Ruch 2003; apud Vriticka et al. 2013). The first stage refers to the detection and resolution of the incongruity (cognitive humor component) and the second stage is related to the positive feeling of reward related to finding the resolution of incongruity (emotional humor component). The cognitive humor component is linked with the activity in the temporo-occipitoparietal area of the brain (TOPA), composed of the posterior superior temporal sulcus (pSTS) and the temporo-parietal junction (TPJ), the latter extending into the temporo-occipital-parietal junction (TOP). TOPA area is engaged in detecting, predicting, and reasoning about social actions and the intentions underlying social actions and due to its connection to the activity in the ventral frontoparietal attentional network associated with attention and decision making (examined by Blanke/ Arzy 2005; Geng/ Mangun 2011; Mitchell 2008; apud Vriticka 2013: 2800), it takes part in incongruity detection and resolution. The emotional humor component reflects the feeling of satisfaction of detecting and resolving incongruity in the joke and it is associated with "the reward-related activity in mesocortico-limbic dopaminergic circuits (MDC), comprising the midbrain (ventral tegmental area [VTA], substantia nigra [sn], ventral striatum (nucleus accumbens, putamen, caudate), as well as ventromedial prefrontal cortex" (Fehr/ Camerer 2007; apud Vriticka et al. 2013).

Barbara Wild et al. (2003) pointed to the activity of the right frontal cortex, the medial ventral prefrontal cortex, and the right and left posterior (middle and inferior) temporal regions as the areas in the brain involved in the perception of humor. P. Shammi and D.T. Stuss stress the importance of the right frontal lobe "unique in integrating cognitive and affective information" (Shammi/ Stuss 1999: 657); the frontal lobes play a crucial role in humor production and appreciation due to their connections with other brain regions related to affective-emotional responsiveness; they also take part in novel problem-solving tasks (therefore can be linked with Suls's incongruity-resolution model of humor comprehension) (Shammi/ Stuss 1999: 662–663). Finally, Ksenija Marinkovic (et al.) (2011)

appoint the right prefrontal cortex as the region responsible for incongruity resolution. The punch lines are processed in a similar way as any other words that are in the left-sided regions of the brain but in case of jokes:

the left prefrontal area may contribute to semantic processing of the meaning plausibility, whereas the right area may search semantic memory for alternative meanings to «get» the joke. Coherent integration of the intended meaning and a sense of amusement may emerge from the dynamic interaction of these regions with special contributions from the right prefrontal region (Marinkovic et al. 2011: 113–130).

Michelle N. Nelly et al. (2012) refer to neural activity in the TOPJ (temporo-occipito-parietal junction) associated with the detection of incongruity in the interpretation of humor (in accordance with Suls's incongruity-resolution model of humor). Their research of humor appreciation in children at the age of 6–12 has shown that:

[u]nlike adults, wherein activation in the TOPJ is left-lateralized (Mobbs et al., 2003), the children [...] exhibited robust TOPJ bilateral activation. It seems that while children do possess humor-specific neural activation in middle childhood, these neural pathways eventually become lateralized during adulthood. Increasing lateralization with age has been echoed in developmental neuroscientific research, including studies of language and reading development [...] (Nelly et al. 2012: 1788; cf. Szaflarski et al. 2006; Yamada et al. 2011).

The above short outline of the brain activity in humor detection and interpretation refers to adults and children belonging to the age group of 6–12 whose mind begins to process humor on the same basis as adults.

Semrud-Clikeman and Glass (2010) emphasize that “[t]here are currently no published studies evaluating functional MRT [functional magnetic resonance imaging] and humor in children or adolescents. The data that are present have been obtained from adults with or without brain damage” (Semrud-Clikeman/Glass 2010: 5) and, based on the research by Weinberg, Harper, Brumback (1995) and Shammi and Stuss (1999), they provide a short list of the brain areas activated in humor processing:

[f]or adults, the main brain regions that have been identified in humor involve the left hemisphere for language functions and the right hemisphere for integration of cognitive and affective functions. Specific brain regions that have been implicated include the frontal lobes (particularly the right frontal lobe), hippocampus, temporal lobe and limbic system, amygdala, and cerebellum” (Semrud-Clikeman/Glass 2010: 5).

The scientists confirm that children's mind processes humor on the same basis as the adults. The only difference lies in the ability to detect and interpret

incongruity hidden behind humor – the capacity acquired by children at different stages of their cognitive development.

Cognitive Development and Humor Appreciation in Children

The Macmillan encyclopedia under *Child Development* distinguishes three major theories of cognitive development (Dyer 2002: 87–92):

1. Jean Piaget's theory of cognitive development – the study of thinking in children (i.e., how cognition changes over time);
2. Lev Vygotsky's sociocultural theory – the influence of culture, peers and adults on the developing child;
3. Information processing theories – children's cognitive development and its relation to physiological changes in the brain and their increasing ability to process information (e.g., changes in working memory or how a child's world knowledge affects it, etc.).

On the basis of Piaget's theoretical framework, Paul McGee proposed a four-stage model of children's humor development (1979) extended into five-stage model (2002) most frequently referred to in literature on the subject (e.g., Klein 1987; Cunningham 2004; Martin 2007; Semrud-Clikeman/ Glass 2010; Klos 2020).

A concise description of Paul McGee's stages of humor development (with some references to Jean Piaget's theory) presented in the form of the table¹ below is thought to serve as a guide for translators of humor in children's literature. Special attention is paid to children's ability to perceive and interpret incongruity as well as their capacity to detect phonological and lexical ambiguity found in humorous texts.

	Cognitive development (Jean Piaget)	Humor appreciation (Paul McGhee and others)
(birth/ 4–5 months old – 2 nd year)	<p>sensimotor stage:</p> <ul style="list-style-type: none"> › the child understands the world through senses and actions, they realize that they are separate beings and that they can cause things to happen around them 	<p>stage 0: laughter without humor</p> <ul style="list-style-type: none"> › smiling without any relation to humorous situation can be noticed › 4/5 months first laughter emerges as a reaction to whispering, unexpected noise, clapping or touching and it expresses the feeling of pleasure

1| The table constitutes a compilation of Jean Piaget's theory of cognitive development used by Paul McGhee to create his four-stage model of children's humor and it is supplemented by the findings and comments by other scholars (T.R. Shultz, Robert Pilon, Amelia Klein) to provide a more accurate description of the stages of children's capacity to detect and interpret humor. The table can serve as a reference for translators at the moment of deciding on the age group their translation is directed at.

	Cognitive development (Jean Piaget)	Humor appreciation (Paul McGhee and others)
middle of 2 nd year to 7 years old	<p>preoperational stage:</p> <ul style="list-style-type: none"> ➤ the child understands the world through language and mental images, i.e., identifies words with symbols and objects ➤ mental development during this stage involves imitation, symbolic play, symbolic drawing and language 	<p>stage 1: laughter at the attachment figure (infancy)</p> <ul style="list-style-type: none"> ➤ the child gets involved in social humor with a parent (e.g., a peek-a-boo game) ➤ children are able to perceive incongruity <p>stage 2: treating an object as a different one object (toddlerhood)</p> <ul style="list-style-type: none"> ➤ children are able to produce incongruity nonverbally (e.g., putting a banana on head pretending it to be a hat) <p>stage 3: misnaming objects and actions (early childhood)</p> <ul style="list-style-type: none"> ➤ children are able to produce incongruity verbally, they enjoy to call things by their opposite name: boy-girl (gender reversal), sit-go, dog-cat, hand-foot, hot-cold (distortion of features) – the child knows the correct meaning of the word and is aware of its incorrect application ➤ children can create nonsense words ➤ in 6/7 years old children linguistic humor is based on phonological ambiguity (Shultz/ Pilon 1973) – they enjoy reading books such as Dr Suess Cat in the Hat, they may laugh at a person speaking a foreign language or wearing a traditional foreign costume (Klein, 1987)
7-12 years old	<p>concrete operational stage:</p> <ul style="list-style-type: none"> ➤ the child develops logical thinking and is able to organize objects in categories ➤ mental processes are now incorporated into coherent systems 	<p>stage 4: playing with words</p> <ul style="list-style-type: none"> ➤ children enjoy rhyming, making-up new (silly) words ➤ children not only perceive incongruity but also can find a resolution to the incongruity ➤ age 7/8 – children can detect linguistic ambiguity

	Cognitive development (Jean Piaget)	Humor appreciation (Paul McGhee and others)
7–12 years old	<ul style="list-style-type: none"> children can mentally manipulate information in problem-solving contexts 	<ul style="list-style-type: none"> age 7/12 children can detect linguistic ability and find solution to it, they are able to appreciate wordplays
12 years old and up	<p>formal operational stage:</p> <ul style="list-style-type: none"> the child understands world through abstract and hypothetical thinking 	<p>stage 5: riddles and jokes</p> <ul style="list-style-type: none"> children are able to memorize jokes and use them to initiate social interactions abstract level of thinking involves the ability to mentally manipulate with more than two objects, to perceive logical inconsistency, to combine abstract ideas which results in a better appreciation as well as active creation of humor

The most crucial information for translators dealing with humor in texts dedicated to young readers are the following: children at the age of 2–7 years are able to perceive (and later understand) phonological ambiguity, therefore they are more likely to appreciate the sound of the humorous text parts (wordplays) whereas children at the age of 7/8 and up can discover linguistic ambiguity in words, i.e., recognize double meaning of words and interpret this meaning in humorous contexts, that is why they laugh not only at the sound of the wordplay but also its (twisted) meaning. Younger children can detect incongruity only to some extent (e.g., misnaming objects by referring to a child's previous experiences as to the qualities or function of the objects) and so they do not have the full capacity to process humor at the phonological/semantic levels.

Humor translation in texts dedicated to children

Simplification, omission, or reduction are translation techniques often applied in children's literature translation. Faithfulness to the original version is not considered as a priority in such cases. However, the rule "tell the same story in another language using your own words" can be substituted by the rule "look at the text, determine the age group it is directed at, and decide if it is the sound or the meaning (or both, if possible) of humorous text parts that should be unconditionally preserved to evoke laughter in children". If children at the age of 2–7 are able to recognize phonological ambiguity in wordplays – the phonetic layer should be privileged in translation. Keeping in mind that children at the age of 7–12 and

up are able to detect and interpret lexical ambiguity in wordplays, the translator should give higher importance to the semantic layer of the wordplays. The ideal translation preserves both the phonetic and semantic layers of the wordplay (its meaning and form), but as the language systems of the source and target texts may differ considerably from each other, the translator is faced with the choice to what extent he/she can interfere in the text to fulfill the requirements of the faithful, and therefore successful, translation. Reference to developmental aspects of children's humor appreciation can constitute a solid justification for applying translation techniques that reflect the translator's decision as to the age group the translated text is dedicated to.

The following section of the article contains a set of translations from English into Polish and Portuguese (in its European and Brazilian versions) of the wordplays present in the famous passage taken from *Alice in Wonderland* by Lewis Carroll, *The Mock Turtle's Story*.² The original text goes as follows [emphasis added] (Carroll 1864/1993: 96–97):

'I only took the regular course.'

'What was that?' inquired Alice.

'**Reeling and Writhing**, of course, to begin with,' the Mock Turtle replied, 'and then **the different branches of Arithmetic – Ambition, Distraction, Uglification, and Derision.**'

'I never heard of "Uglification",' Alice ventured to say. 'What is it?'

The Gryphon lifted up both its paws in surprise. 'What! Never heard of uglifying!' it exclaimed. 'You know what to beautify is, I suppose?'

'Yes,' said Alice doubtfully: 'it means – to – make – anything – prettier.'

'Well, then,' The Gryphon went on, 'if you don't know what to uglify is, you *must* be a simpleton.'

Alice did not feel encouraged to ask any more questions about it, so she turned to the Mock Turtle, and said, 'What else had you to learn?'

'Well, there was **Mystery**,' the Mock Turtle replied, counting off the subjects on his flappers, – '**Mystery, ancient and modern, with Seaography**; then **Drawling – the Drawling-master** was an old conger-eel, that used to come once a week: he taught us **Drawling, Stretching, and Fainting in Coils.**'

School subject names mentioned in the passage are wordplays based on the distortion of the meaning and/or the sound of the actual subject names in English Victorian school. The table below illustrates the changes in the school subject names applied by the author at the semantic and/or phonetic levels:

2| The full analysis of the translation procedure applied to the passage and based on the theory of conceptual blending can be found in Klos, Sylvia (2020). *Humour and Translation in Children's Literature. A Cognitive Linguistic Approach*, Katowice: Wydawnictwo Uniwersytetu Śląskiego. The article includes the examples of the translations not mentioned in the book.

Subject name in real world	Subject name in Wonderland
Reading and writing	Reeling and Writhing
Different branches of Arithmetic – Addition, Subtraction, Multiplication , Division	Different branches of Arithmetic – Ambition, Distraction, Uglification , and Derision.
History , ancient and modern	Mystery , ancient and modern
Geography	Seaography
Drawing (Drowning?) and Gymnastics	Drawling, Stretching, and Fainting in Coils
Latin and Greek	Laughing and Grief

Translators challenged to transfer the wordplays into their target languages, aware of the differences in the capacity to appreciate humor by children at different stages of their cognitive development, may decide to apply translation techniques that would respond to the needs and expectations of the audience their translation is directed at. The main purpose (skopos) of translation is to evoke laughter in young readers and it is possible if the translated text is adjusted to their ability to process humor at a given age.

Next, the tables with Polish and Portuguese translations of the wordplays taken from the *Mock Turtle's Story* show how various translators approached the problem of preserving the meaning and/or the sound in the target texts:

Subject name	Maria Morawska (1947)	Krzysztof Dworak (2009)	Bogumiła Kaniewska (2010)	Robert Stiller (1986)
czytanie i pisanie	the author uses descriptions instead of wordplays	czekanie i pluskanie	nawijanie i wykręcanie	czyhanie i zwisanie
dodawanie, odejmowanie, mnożenie i dzielenie	dolewanie, odlewianie, monolewanie i rozlewanie	oddawanie, obejmowanie, mądrzenie i ubrzydzenie	ambicjonowanie, różniczkowanie, szkaradzenie i ironizowanie	wodowanie, obejmowanie, mrożenie i obrzydzenie
historia starożytna i współczesna	histeria nowoczesna i starożytna	histeria starożytna i współczesna	sekretyka historyczna i współczesna	histeria starożytna i nowoczesna
Geografia	Choreografia	Wodografia	Morfografia	Wodografia

Subject name	Maria Morawska (1947)	Krzysztof Dworak (2009)	Bogumiła Kaniewska (2010)	Robert Stiller (1986)
rysunek i gimnastyka	starunek i farbiarstwo	frasunek, skecz i falowanie	przedciąganie, rozpociąganie, obwijanie	rybunek, szprycowanie i falowanie
łacina i greka	skakanie i płakanie	gadzinia i draka	śmiech i smutek	łyšina i grdyka

Subject name	European Portuguese		Brazilian Portuguese	
	Vera Azancot (2000)	Alexandrina Bento (1998)	Maria Luiza X. De A. Borges (2002)	Isabel de Lorenzo (2000)
leitura e escrita	mergulhar e Nadar	Reler e Escer-vinhar	Lentura e estrita	Remeler e Des-sencrever
Diferentes ramos de Aritmética: Adição, Subtração, Multiplicação e Divisão	os diferentes ramos da aritmética – Ambição, Distracção, Derisão e Mortificação .	Os diferentes ramos da Aritmética: Ambicionar, Distrair, Desfear e Ridiculizar.	os diferentes ramos da Aritmética: Ambição, Subversão, Dessebelezação e Distração.”	Os diferentes ramos de Aritmética; Ambição, Distração, Putrificação e Derrisão
História Antiga e Moderna	os Mistérios Antigos e Modernos	Mistério, Antigo e Moderno	Histeria antiga e moderna	Escória antiga e moderna
Geografia	Oceanografia	Mareografia	Marografia	Maregrafia
Desenho e Ginástica	o Tartarugelar, a Extorisionar e a Cair em Espiral	(Falta? ou interpretação de Drawling como Drowning), Movimento Lento, Espreguiçar e Queda em espiral	Desdém; a Desdenhar, Embolsar e Pingar a Alho	Desdenho, desdenhar e fintar sobre vela
Latim e Grego	Absent	Absent	Latido e Emprego	Letras Crespas e Ladinas

Both Polish and Portuguese translators approached the translation challenges related to transferring the wordplays from the source language into the target language with creativity and imagination. Various references to the aquatic world

have been made in the meaning construction of the school subject names: in some cases the whole words have been substituted (e.g., Krzysztof Dworak: “pluskanie” [splashing] in place of “pisanie” [writing], Vera Azancot: “mergulhar e nadar” [dive and swim] in place of “leitura e escritura” [reading and writing]) in other instances only word parts have direct connection to the Mock Turtle’s sea school (e.g. Robert Stiller: “rybunek” [word combining ‘ryba’ [fish] with ‘rysunek’ [drawing]).

There are also examples of unexpected words used in the translation whose meaning is completely unrelated to the sea world or the school subject, but their pronunciation is similar to the one in the real subject names (e.g., Robert Stiller: “czyhanie” [lurking] placed instead of “czytanie” [reading], “łysina” [baldness] used in place of “łacina” [Latin]; Krzysztof Dworak: “gadzina” [reptile], also cattle in place of “łacina” [Latin] and “draka” [rumpus] in place of “greka” [Greek]; Maria Luiza X. De A. Borges: “lentura” [slowness] used in place of “leitura” [reading] or “emprego” [employment] used in place of “grego” [Greek]).

The wordplay “uglification” requires special attention in the translations cited above. The word “uglification” does not exist in English, but it can be constructed on the basis of the analogy in the word’s formation: if there is a verb “beautify” and its derived noun “beautification”, we can have a verb “uglify” and its derived noun “uglification”, which means the process of becoming uglier, losing beauty as we get older. The wordplay contains a hidden deeper meaning not directly but still referring to death – the theme considered as taboo, especially by younger readers. Such interpretation of the wordplay has been taken into account by Portuguese translator – Vera Azancot – who uses the wordplay “mortificação” – also a non-existent word in Portuguese whose meaning includes a reference to the death theme: “morte” in Portuguese. Other Brazilian Portuguese translations of the wordplay “uglification” reflect the meaning of losing beauty (Maria Luiza X. De A. Borges: “desembelezação” [un-beautification]) or express the idea of becoming rotten (Isabel de Lorenzo: “putrificação” [putrefaction]) which can be interpreted as a kind of passing away.

All the examples discussed above demonstrate how meaning has been manipulated to create wordplays in the target language – the translators also play with sound, but the main focus is put on the semantic aspects of the wordplays. The texts with such wordplays require the audience to be able to perceive and interpret linguistic incongruity which is only possible in case of the reader at the age of 7/8 and up, younger children may ‘hear’ the distorted sound, but they might have problems with grasping the ‘twisted’ meaning in the wordplays.

Moreover, logical and abstract thinking is required to decipher the logic of creating the wordplay “uglification” as well as its hidden semantic layers together with their deeper interpretations. Only children at the age of 12 and up have the capacity to process humor at this level, younger readers need adults’ assistance to fully understand the wordplay.

Conclusions

Knowledge on humor processing in the human mind as well as on the stages of cognitive development in relation to the capacity to appreciate humor by children is essential to set appropriate translation goals (skopos), strategies and techniques to succeed in the reconstruction of the humorous context of the source text and its effect on the audience in the target text. The ability to detect and interpret incongruities in the humorous text should be taken into account by the translator at the moment of deciding on the age group of the receivers of the translated text. Younger readers enjoy humor based on the play with sound, they are able to detect 'errors' in words' pronunciation (mixing the order of letters or syllables). Older readers have the capacity to find the double meaning of the words and explain why in certain contexts the words sound funny. The ideal translation preserves both the phonetic and semantic layers of the humorous text parts, but when the translator needs to decide if it is the meaning or the sound that should be unconditionally preserved in the translation (e.g., due to the substantial differences in the two language systems), the age group of the receiver determined before proceeding to translation supports later decisions taken at the moment of working on a given humorous passage or wordplay. In the preface to the translation, the translators might indicate the age of the reader, or suggest reading the translated book with the support of parents or other adults. Such an approach to children as young readers, with full comprehension of their needs and expectations as well as their capacity to interpret texts based on the knowledge on developmental psychology, can contribute to successful translation of the humorous texts dedicated to a juvenile audience.

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