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Knowledge about the joy in children with mild intellectual disability

Abstract: The aim of this study was to characterize the knowledge about the joy in children with mild intellectual disability. The premises relating to mental functioning of these children suggest that this knowledge is poorer and less complex than the knowledge of their peers in the intellectual norm. The study used the authoring tool to measure children's knowledge of emotions including the joy. This tool takes into account the cognitive representation of the basic emotions available in three codes: image, verbal, semantic and interconnection between the codes – perception, symbolization and conceptualization which perform the functions of perception, expression and understanding. The study included children with the intellectual norm (N = 30) and children with mild intellectual disability (N = 30). The obtained results mainly indicate the differences in how the happiness is understood by particular groups, to the detriment of children with disability. The character of the results is largely determined by the level of organization of knowledge about the joy and accompanying mental operations. The results will be discussed, among others, in the context of the adjustment of the programs of lasting increase of happiness for people with intellectual disability.

Key words: mild intellectual disability, joy, knowledge about emotions

Introduction

A second class student of primary school said that "joy is like floating in the air" (Wiśniewska-Kin, 2009, p. 158), while her colleague said that "joy is like energy" (Wiśniewska-Kin, 2009, p. 156). Such statements were possible because every emotion, like other phenomena of non-linguistic reality, may be the subject of mental representation and be written in a different than the native system of signs in the form of the concept of emotion which, in the given examples, was reflected in the language metaphor (Nowakowska-Kempna 2000, pp. 87–88; White, 2000). With this regularity, the innate, biologically determined disposition of the body ("the original" physiological-somatic affection) becomes the subject of thought ("secondary" interpreting structures) (cf. *Ideas and realities of emotion*", Parkinson, 1995; Niedenthal, 2008; White, 2000, p. 31). It is, therefore, assumed that life of the individual is determined by both, the experience of emotions and the way of representing this experience

in the cognitive system, so-called "emotions without emotions" (Duszak, 2003; Jasielska, 2013; Maruszewski & Ścigała, 1998; Szumska, 2000). The subject of the listed metaphors was the only emotion of the positive valence from the group of basic emotions. The joy and the positive emotions are the object of studies of positive psychology. The general conclusion resulting from the research in this area is clear and shows that the experience of 3:1 ratio of positive to negative emotions (Fredrickson, 2011) affects the subjective sense of happiness and improves the quality of life. One of the possible ways of arranging the experience of positive emotions beyond the automatic responses (homeostatic and hedonic) is the reflective impact of these emotions by involving advanced thought processes which take into account self-standards and axiological standards (Jasielska, 2014, p. 85, pp. 170–171). To start this process, it is necessary to represent positive emotions, e.g. the joy, in mental space, which is dominated by abstract forms of recording, constituting the individual's knowledge about emotions (Jasielska, 2013; Maruszewski

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& Ścigła, 1998; Stępień-Nycz, 2015). The question therefore arises whether the individuals for whom the deficits in intellectual processes are characteristic, are likely to have as advanced knowledge about the joy, and consequently awake emotional experiences in the reflective way, as healthy individuals. The answer to this question will be searched in the context of knowledge about joy that children with mild intellectual disability have.

The knowledge about emotions

The children's knowledge about emotions is "a child's found of information about emotion and emotional experience in the self and others that is used to understand and interpret events in the enviroment" (Brenner & Salovey, 1997, p. 176 and p. 183). It is through emotional knowledge that the individual knows what the emotion is and how it works, identifies and understands the emotional experiences of his/her own and of other people (Górecka--Mostowicz, 2005; Nowakowska-Kempna, 2000; Pakinson, 1998; Smith, 1995, p. 411), and furthermore, when the individual understands the emotions, he/she remains in relation to his/her emotional functioning (Jasielska, 2013). The elements of this knowledge include information on: the origin of emotions, the causative factors responsible for the emergence of a particular emotion, the influence of emotions on behavior specific to a particular emotion, control and activation techniques, connection of a particular emotion with other emotions, the value attributed to the particular emotion in the individual system of meaning, prediction of their course, the factors that determine their strength, duration, consequences, etc. (Colman, 2001, p. 283; Fernandez-Dols & Bachorowski, 2009; Maruszewski & Ścigała, 1998, p. 73; Russell & Lemay, 2000, p. 493). With the knowledge about emotions "…we know what it means to be angry, how to behave when we are scared, what we say when we are in love, and what events lead us to frustration or joy. The knowledge about emotions is used when we talk to people, write e-mails or read a book and allows us to give the meaning to our own emotions and the emotions of others (authors' transl. from Oosterwijk, Rotteveel, Fischer & Hess, 2009, p. 425). This approach is a consequence of the assumption of everyday psychology (Heider, 1958), saying that this psychology contains so-called operational knowledge, where one of the aspects is the descriptive knowledge mainly of an informative nature, and the other one is the interpretive knowledge used while behaving in a certain way, e.g. in emotogenic situations.

One of the forms of the emotional knowledge discussed in the literature, next to, for instance, the narrative or aboriginal approach (cf. Jasielska, 2013, pp. 37–61) is a model of mental codes and interconnections between them (cf. the code-emotion concept by Obuchowski, 2004). Such character has the concept of Bucci (2000), which assumes that the coding schemes of emotions are memory schemes which represent interactions with important people from the early stage of life. Representation of emotions arises from the nuanced, precise and multiple transcoding between the specific codes. The recognized codes include: 1. subsymbolic, operating on sentient, corporal and motor data, 2. of symbolic representations which take the form of symbols and images, 3. of verbal symbols, containing the verbal schemes of emotion. In terms of these codes, there are two basic modes of emotional and memory processing. The first one which appears at the earlier stages of development, is hidden, preverbal and associative, and includes the subsymbolic level and the level of symbolic images. The system is associated with corporal reactions. Within its area there are automatic and rapid processes such as priming or a spreading activation. The other mode occurs in the later stages of development and takes the form of the propositional rational system which is analytical, reflective and logical. This system is based on the advanced executive functions and the verbally available semantic information. Both systems are connected by "reference links". When there is an integration of somatic, sensory and motor representations with symbolic representations within emotional schemes, then the reflection of emotions in the structures of the mind is correct (Bucci, 2005).

The similar character has a proposition of Karmiloff-Smith (1995), who introduces similar to the "reference links" concept of "redescription of representation", understood as a continuous process of "rewriting" of knowledge in different codes at different levels of transparency. According to the Author, there are four levels of transparency determined by differentiated access of awareness and the ability of verbalization and cognitive operations, which can be performed on these data. Redescription process allows the individual to use the explicit and implicit knowledge. It can be initiated from the outside and from the inside. It includes three recursive phases that occur repeatedly during the development. In the first one, there is the addition of new information and proceduralization leading up to the so-called behavioral championship. At this stage, the behavior is entirely inaccessible to the conscious cognition. This phase is driven by data and aims to automate the behavior. Presumably, within the emotions, it would be about the acquisition of such emotional skills as, for instance, the recognition of emotions or the way of expressing them. In the second phase, there is a return from the external data to the internal representation. The individual reflects upon his/her knowledge, so he/she has a chance to observe some rules which are present in the emotional behavior. In the third phase, there is a connection of the external data and the internal representation through creating a new mapping between two data sources. Karmiloff-Smith (1995) is of the opinion that the process of redescription and the resulting development of representation can occur in two directions. On the one hand, it is about the declaration process (cf. de-proceduralization) of the knowledge contained in the procedures by which the individual cannot only express emotions, but also he/she is declaratively able to report how to do it, e.g. knows which words to use to express and describe the experienced emotions and knows the rules governing the disclosure of emotions. The other direction

is proceduralization of the declarative knowledge dictated by verbal instruction in accordance with the acquisition of procedural knowledge, which subsequently will be automated and allow the individual, for instance, to regulate emotions in the situation of social exposure (Stępień-Nycz, 2015, pp. 41–42).

These proposals are complemented by the concept of mental representation of emotions based on the triangulation of Odgen and Richards (1989), written by Maruszewski and Ścigała (1995). The authors assume that the knowledge about emotions is organized hierarchically on the basis of the image, verbal and abstract codes, and the processes associated with their transformations (Maruszewski & Ścigała, 1998). The image code generate the primitive, inaccesible for the consciousness script representations filled with personalised content and, as such, are the basis for the different responses of different people on the same situational stimuli. This code is combined with the verbal code, the processes of verbalization and visualization. In the verbal code, the representation of emotions has a form of a prototype, and includes the typical, generalized knowledge about emotions, most commonly experienced in certain situations. Its connection with the abstract code constitutes processes of semantization and desemantization. In the abstract code arises the most generalized representation of emotion which consists in giving the meaning. Within it, the emotions are represented as concepts which contain the priori knowledge in the form of colloquial theory of emotions. The abstract code combines with the image code through a pair of processes, such as symbolisation and desymbolisation. Particular codes and their mutual transformations do not only contain the meaningful aspect of the emotional knowledge, but also taken under them the cognitive and instrumental actions in the form of functions such as perception, expression and understanding (conceptualization) of emotions which are induced within them.

Theoretical models for the social knowledge, including, among others, the knowledge about emotions, indicate the existence of two components: perceptual (corresponding to the processes of perception and understanding) and conceptual (corresponding to of the so-called theories of mind) (Stępień-Nycz, 2015 p. 35). There is a consensus that only the knowledge about emotions encoding data in the abstract way and using for this the complex thought processes, can give to the individual the measures of emotional control.

Cognitive deficts and emotional functioning of children with mild intellectual disability

Intellectual disability can be one of the factors that affect the emotional knowledge of the individual, because it is organized on the basis of the image, verbal or abstract codes and requires the involvement of cognitive and instrumental actions such as perception, expression and understanding (conceptualization) which are disturbed in these people.

According to the International Classification of Diseases (ICD-10), mental retardation is "a condition of arrested or incomplete development of the mind, which is especially characterized by impairment of skills manifested during the developmental period, skills which contribute to the overall level of intelligence, i.e. cognitive, linguistic, motor and social abilities." (Pużyński & Wciórka, 2000, p. 189). The disorder has been placed in the group of mental and behavioural disorders (code F70-F79). On the basis of intelligence quotients range, the authors of ICD-10 distinguished the levels of intellectual disability. A person with mild intellectual disability (IQ 50-69) reaches in his/ her adulthood the maximum level of mental development comparable to the age of intelligence of a 9–12 year-old in the norm (code F70) (Pużyński & Wciórka, 2000, p. 190).

Building the knowledge about emotions is based on the processes of perception and conceptualization. In terms of understanding the knowledge, children with mild intellectual disability, due to their specific development, have limitations. Although the cognitive development of a child with mild intellectual disability covers the same phases as the development of children in the intellectual norm, it runs slower and does not exceed the phase of thinking by the concrete image thinking (Piaget & Inhelder, 1993, p. 65). Therefore, they do not achieve the level of formal operations, and as a consequence, thinking of these children is not abstract or hypothetical-deductive (Kościelska, 1998, p. 100; Kostrzewski, 1981, pp. 114–117; Obuchowska, 1999, pp. 233–234; Pilecka, 2003, p. 17; Wyczesany & Gajdzica, 2006, p. 69). It results in deficits in the field of analysis, synthesis, abstraction and generalization, which determines the way of understanding emotions. Children with mild intellectual disability have an impaired skills for syllogistic, inductive and analogy reasoning. Their reasoning is characterized by the reduced criticism, difficulties in capturing the essence of the dependencies or the events, the relationship between the conclusion and the premises. In addition, these children during the early school do not reach the state of sustainable balance, which enables them to move freely between the levels of thinking, which often results in loosing threads, rigidity of thinking and little flexibility. Difficulties in changing the way of thinking lead to the use of well-known schemes in solving new tasks (Buchnat, 2015, p. 37). The rigidity of thinking, making logical mistakes, inability to make generalizations or abstractions result in a low level of understanding emotions, particularly in changing conditions of cognition. Disturbances in the field of abstract thinking and the process of decentration make the feelings be perceived as a part of a particular situation, which significantly reduces the ability to empathize with the situation of another person. Only the long-term training of empathy allows them to understand the subjectivity of feelings and their situational context (Gajdzica 2007; Simeonsson & Bailey, 1988). The low level of empathy has also an impact on building emotional ties and the ability to communicate (receiving and transmitting messages and recognizing the intentions of the partner's interaction).

As the level of thinking of children with mild intellectual disability implies other cognitive processes, perception of knowledge about emotions is also poorer

because of the deficits in the area of individual cognitive processes. Perceptual processes in children with mild intellectual disability are characterized by inaccuracy, a narrow range and a slow pace (Wyczesany & Gajdzica, 2006, p. 68; Zabłocki, 2003, p. 29). The inaccuracy, the narrow range and the slower pace of perception are influenced by disorders of auditory and visual perception, which make children with mild intellectual disability perceive reality in a distorted way. They mainly focus on external characteristics of objects, e.g. colour, omitting specific features. This level of perception causes difficulties in the comparison of objects, searching for their similarities and differences, as well as finding interrelationships between them. Children with mild intellectual disability perceive much less items in a given time than children in intellectual norm, for which the slower cortical processing is responsible, and the perception of the surrounding reality is even poorer (Buchnat, 2015, p. 40; Chrzanowska, 2003, p. 10; Wyczesany & Gajdzica, 2006, p. 68; Zablocki, 2003, p. 29). These difficulties are reflected in the range of social perception and make it difficult to observe the changing feelings, moods, following the changes in the behavior of the other person, as well as of him/herself, which impoverishes the possibility of perception and understanding emotions. This situation is deepened by the deficits of concentration, which further complicate collecting the data needed to determine emotional state. Little divisibility of attention causes that children in the process of collecting information cannot effectively use a variety of sources.

Limited perception of reality will be important for its understanding, which is also limited. In addition, the use of the knowledge already gained is also hindered by the low level of memory. Unfortunately, the ability to use increasingly sophisticated memorization strategies is linked to the changes in thinking (Stefańska-Klar, 2005, p. 135), therefore, the logical memory of people with mild intellectual disability is very poor, whereas the mechanical, associative memory is at an average level (Kijewska, 2006, p. 283). These people have problems in all areas of memory processes, from encoding the collected information through the active maintenance of information in the articulatory loop to the total deficit of short- and long-term memory (Nęcka, 2003, pp. 182–185). They better remember the material concerning the present, which is associated with their own experiences and based on emotions. Such material is stored in the episodic memory. This type of memory in children with mild intellectual disability occurs at the same level as in children in the norm. However, significant limitations are observed in the field of semantic memory because memorizing linguistic messages which create the system of knowledge, requires complex conceptual operations that are disturbed in children with intellectual disability. (Kościelak, 1989, p. 48).

Children with mild intellectual disability are characterized by a limited memory capacity, show deficits in acquisition of the new material, they quickly forget it, and its playback from memory is inaccurate. They are also not able to use the newly acquired knowledge in practice and often learn by heart, without understanding (Głodkowska, 2000, p. 68). Such specific features of memory hinder understanding of social situations, reading emotions, which are highly variable in the way of expression and depend on the social-cultural context.

Verbalization of emotional states will also be poorer in children with mild intellectual disability, because they are characterized by defects at the level of linguistic skills. Grabias (2001, p. 33) indicates that this deficit is due to the degree of intellectual disability and the severity of speech disorders is directly proportional to the depth of disability.

In terms of lexis, speech in children with mild intellectual disability is mainly characterized by poor vocabulary. Their statements are dominated by nouns and verbs and they rarely use adjectives and adverbs. The adjectives they use define the sensory characteristics and the adverbs indicate how an action is performed (Rakowska, 1980, pp. 121–130; Wyczesany & Gajdzica, 2006, p. 70). They also have difficulty in decoding the meanings of particular words or sentences, making it difficult for them to recognize the communication properly. A low ability to capture the meaning of the existing situation compounds problems with understanding the message. Lack of understanding of the situational context, low ability to use knowledge to explain the state of reality, difficulties to see the problem and name it, reduce the communication competence of children with mild intellectual disability (Rakowska, 1996, p. 309). The study indicates, however, that the language activity of these children depends on the created for them social situation, emotional climate in the family, motivation for speaking and personality of the child (Jęczeń, 2003, p. 129). The results of the research by Abbeduto and Biblera Nuccio (1993) indicate that people with intellectual disability, while formulating statements, take into account the partner's emotional state during the conversation and the level of his/her activity. The results of this study lead to the conclusion that the development of speech is determined by the quality of the relationship with the social environment (Buchnat, 2015, p. 43). People with mild intellectual disability have also problems with formulating messages understandable to the receivers, however they often blame the recipient for the lack of understanding. They also show deficits in providing descriptive information, and also when the message refers to the imaginary, abstract or new situation, unknown from the past experience (Twardowski, 2002, pp. 13–19). The research carried out by Abbeduto and colleagues (1991) indicates that people with mild intellectual disability have problems with avoiding disruptions in communication, e.g. asking questions which could clarify the given situation. In a situation of misunderstanding of the message, children with mild intellectual disability, instead of asking the partner for explanation, tried to guess his/her intentions, but often without the success, what led to the interruption in the conversation. All these difficulties characterizing children with mild intellectual disability cause communication restrictions which determine the way of expression by a child with mild intellectual disability.

The level of thinking achieved by children with mild intellectual disability that prevents reception of abstract information, as well as limitations on the analysis, synthesis, abstraction and generalization, and eventually disturbances in terms of perception, attention, memory and speech will contribute to a poorer perception and conceptualization of the knowledge about emotions. And the process of conceptualization demanding higher thought processes will be even more limited.

The joy, the exemplification of positive emotions

The joy belongs to the group of basic emotions and as one of them has a clearly positive valence (Ekman, 1992; Fehr & Russell, 1984; Turner & Stets, 2005). It is caused by "the achievement of intermediate goals" (Oatley & Johnson-Laird, 1995; cf. Lazarus, 1998, p. 148) and initiates the behavior of the individual associated with the continuation of the current action, interaction, and displays of affection. The joy is sometimes also understood as the short-term emotion of happiness (Ben-Ze'ev, 2000, p. 450), or happiness understood as a state of high activation (Averill & More, 2000, p. 663). Positive psychology explicitly includes the joy to the group of positive emotions, next to, for instance, satisfaction or curiosity that foster the sense of being happy and well-being which, in turn, increases psychological well-being (Fredrickson & Cohn, 2008; cf. Trzebińska, 2008). In addition, it is postulated the existence of several kinds of joy to emphasize the fact of exceeding the hedonistic trend related to temporary improvement in mood or short-term stimulus of an eudaimonistic character related to the implementation of the self-standards (e.g. becoming better) or axiological (e.g. making the world a better place) (Jasielska, 2014). According to this postulate, it seems that knowledge about the joy, critical for generating the joy of reflective origin, can be rich and varied and it favors the creation of personal well-being. Since, the character of emotional experience can be shaped much by the cognitive system, which is successfully proved in the traditional, probably known to the Reader, study of optimistic vs. pessimistic style of explanation (Seligmann, 1993) and the contemporary research on the psychological structure of emotions. The constructive model of emotions assumes that the knowledge about emotions has a significant part in creating the emotional experience (Barrett, 2011). In short, the experience of emotions is the act of categorization of affective experiences, driven by the embodied knowledge about emotions. In this perspective, the emotions are like the acts of perception involving the interpretation of dynamic sensory data using the data storage (Barrett 2005, 2006, 2009, 2011; Barrett, Ochsner & Gross 2006; Barrett, Lindquist & Gendron 2007; Barrett, Mesquita, Ochsner & Gross 2007). The formation of the emotion is that the experience of a particular valence and arousal is automatically and effortlessly categorized by the conceptual system of emotions as the separate emotion. That conceptual system is a store of memory-based knowledge about the emotion persisted in the language, which is shaped by previous experiences. The system is rich in contextually-specific concepts of particular emotions. Thus, the individual does not have only one concept such as joy, but the entire collection of interpretations, which he/she can adapt in varied and flexible ways.

The above evidence shows that cognitive processes and, more precisely, the level of intellectual development of the individual can affect the excitation and experiencing the joy through the knowledge about it. Therefore, the surveys were undertaken among children with mild intellectual disability and children in the intellectual norm aiming to compare knowledge about the joy manifested within three codes – image, verbal and abstract, applied within the three functions – perception, expression and understanding. It is assumed that the developmental limitations of children with mild intellectual disability will cause less extensive knowledge about emotions, because it requires the involvement of cognitive and instrumental actions, which are disturbed in these children.

The study presented later in this article is based on the theoretical proposal about the mental representation of emotion which was successfully used for the research on the emotional knowledge of children in the intellectual norm. (Górecka-Mostowicz, 2005; Stępień-Nycz, 2015).

Method

Participants

When selecting participants for the survey, the following criteria were taken into account: having the evaluation of the needs for special education because of mild intellectual disability ("mild mental retardation" is a valid terminology in the evaluation), lack of couplings – prevalence of diagnosed movement, sensory or autism spectrum disorders, the implementation of education in a town (over 20 thousand inhabitants) of Greater Poland Voivodeship. The lack of couplings criterion was used to limit additional factors that affect the emotional functioning of a child. For children selected from the database of Educational Information System (SIO), the following procedure was applied: the principal of the school was contacted and asked for permission to conduct the research, and then asked questions to verify and detail information about the child to confirm: the degree of intellectual disability, the presence of additional couplings, or the lack of them. Having obtained the consent of the school principal to conduct the research and confirming compliance with the criteria met by the student, the parents or the legal guardians of the child were asked for the consent to participate in the research. Total study involved 30 students with mild intellectual disability, including 15 girls and 15 boys at the age of 8–9 ($M = 8.72$; $SD = 0.44$). The participants of the control group were 30 students in the intellectual norm implementing general education in the town (over 20 thousand inhabitants) of Greater Poland Voivodeship. There were 15 girls and 15 boys at the age of 8–10 in this group ($M = 8.81$; $SD = 0.44$) [t (58) = 0.84; p = ns.].

Materials

To measure the children's knowledge about the joy, the authoring tool consisting of nine tasks requiring open and closed answers was used (cf. Jasielska & Buchant, 2014; Buchnat & Jasielska, 2015; Jasielska & Buchnat, 2015; Jasielska & Buchnat, 2016). The article presents the piece of the research concerning the emotions of joy. The entire battery is used to measure the knowledge of six basic emotions (happiness, sadness, fear, disgust, surprise, anger) and consists of 54 tasks. Particular tasks for the joy which use specific codes and functions of knowledge and the measurement methods, are presented in Table 1.

Procedure

The survey was conducted during two meetings, the length of which depended on the pace of work of the examined child (each of the meetings took approximately 50 min). In each testing day, the tasks performed by a child were represented by each of three codes: image, verbal and abstract. The sequence of tasks was chosen so as to be attractive for a child because of the changing material and the form of response. Each task was first demonstrated to the child as an example, in order to ascertain whether the child understood the instruction correctly. During the first meeting the children performed the following tasks:

Table 1. Battery of tasks used to measure the particular processes and codes on the knowledge about the joy with methods of measurement

Code/ function	Process	Task	Measure
Image code / perception	identification of mimic expression from a photo	task "picture"[a]: the isolated photo of the boy expressing the joy is presented to the participant of the study; the participant answers the question "What is the baby in the picture feeling?"	answers were classified: 1. lack of identification (no response) 2. incorrect identification (e.g. thinking, sadness) or general (e.g. feels good) 3. acceptable identification (e.g. smile) and the negation (e.g. not sad); in a task situation, e.g. surprise 4. correct identification and synonyms (e.g. happiness)
	recognition of emotions based on situational context and behavior	task "scene"[b]: the cartoon scene of getting a present is presented to the participant of the study; the participant answers the question "What is the boy feeling?"	
	identification of mimic expressions based on the graphical scheme of face	task "emoticon"[c]: the isolated graphical scheme of face expressing the joy is presented to the participant of the study; the participant answers the question "What is the face feeling?"	
verbal code / expression	the disclosure of knowledge about emotions; defining names	task "conversation"[c]: with the participant of the study; structured conversation containing questions: "What does the word 'joy' mean?", "What comes to your mind when you hear this word?", "Have you ever seen someone joyful?", "Imagine someone joyful, what happens then?", "How can you you know that someone is joyful?"	For every accurate answer the participant receives 1 pt. For an accurate answer to the open questions it is considered the answer that is correct and differs in the content from the previous answers. For an accurate answer to the close question it is considered the answer with an example, expansion or self-reference; result min = 0, max = 5.
	matching words to the given semantic field	task "sentences"[c]: the participant of the study is to complete the unfinished sentence about the cause of the joy "When someone wins the prize, he/she feels..." and the behavior being an expression of the joy, "When someone smiles he/she feels..."	answers were classified: 1. lack of matching (no response) 2. incorrect matching (e.g. fear) or general (e.g. feels good) 3. acceptable matching (e.g. different emotion, surprise or smile) or (e.g. not sad) 4. correct matching (e.g. happiness)

Table 1. continued

Code/function	Process	Task	Measure
	applying socio-cultural knowledge	the task of "proverb"[a]: the participant of the study answers the question, "Who is laughing?" selecting the answer from three proposals (test): a. "Who is in a good mood?" b. "Who is laughing at the end?" c. "He has heard the funny story?"	answers were classified: 1. lack of application of knowledge (no response) 2. incorrect application of knowledge (resp a, c) 3. correct application of knowledge (resp. b)
abstract code / understanding	desemantization of linguistic metaphor	task "title"[b]: the book cover with the title "Smile White" is presented to the participant of the study and its task is to determine what would the emotion experienced by the literary character of this book be	answers were classified: 1. lack of desemantization (no response) 2. incorrect desemantization (e.g. fear, thoughts) or general (e.g. feels good) 3. acceptable desemantization (e.g. different emotion: surprise or smile) or (e.g. not sad) 4. correct desemantization and synonyms (e.g. happiness)
	desymbolization of iconographic metaphor	the task "iconographic"[c]: the book cover with the iconographic ☝ is presented to the participant of the study and its task is to determine what would the emotion experienced by the literary character of this book be	answers were classified: 1. lack of desymbolization (no response) 2. incorrect desymbolization (e.g. fear, thoughts) or general (e.g. is doing well, ok, likes) 3. acceptable desymbolization (e.g. smiles) or negation (e.g. not sad) 4. correct desymbolization and synonyms (e.g. happiness)
	symbolic association of linguistic and iconographic metaphor	the task "matching"[a]: the book covers with, among others, the iconographic ☝ is presented to the participant of the study, the participant has to choose the cover of the read book title; in the case of the joy – "Smile White"	answers were classified: 1. lack of association (no response) 2. incorrect association (e.g. "Smile White" – ☠) 3. acceptable association (e.g. "Smile White" – ?) 4. correct association

[a] Author's task
[b] task by Górecka-Mostowicz (2005), (cf. Stępień-Nycz, 2015)
[c] task inspired by Górecka-Mostowicz (2005)

emoticon, scene, conversation and title. On the other day, they accomplished the task: photo, opinion, iconographic, proverbs, matching. During the directed conversation, the responses were recorded on the dictaphone.

Measures

Due to the fact that in most of the tasks (except the task of the proverb) the answers given by the participants were open, three competent judges were asked for their assessment. The judges – psychologists and special educators applied the criteria presented in Table 1.

The agreement between the judges was satisfactory and amounted Kendall's$_{min}$ Tau-b = 0.84; $p < 0.001$ – Kendall's$_{max}$ Tau-b = 1; $p < 0.001$.

Results

Analyses for the image code (function-perception)

There was a significant difference between the groups in the identification of the mimic expression of the joy in the picture $\chi2$ (2, $N = 60$) = 9.23; $p < 0.01$. The strength of association between the variables, Cramer's
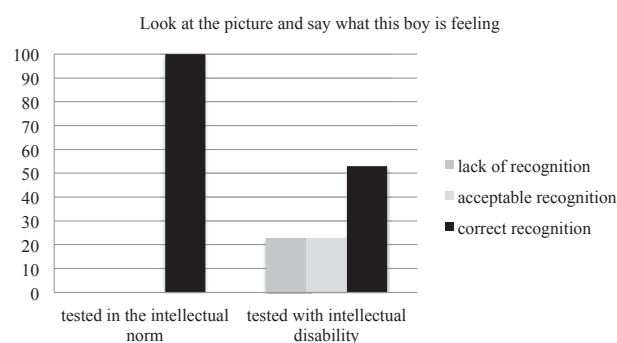
$V = 0.39$; $p < 0.01$, indicates moderate correlation between intellectual disability and the correct identification of the joy. Children in the intellectual norm much more often correctly identified the joyful mimic expression than their peers from the criterion group (see Figure 1).

**Figure 1. The differences between the groups in the task "picture"**
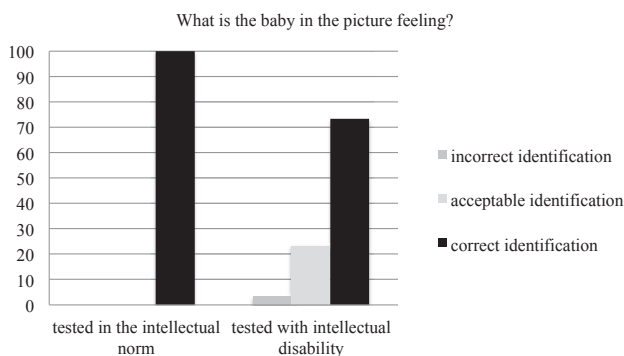
The difference between the groups in the identification of the joy based on the situational context and behavior shown in the cartoon scene was also significant χ^2 (2, $N = 60$) = 18.26; $p < 0.001$. The strength of the association between variables, Cramer's $V = 0.55$; $p < 0.001$, indicates a strong correlation between the degree of intellectual disability and the correct identification of the joy. Children in the intellectual norm much more often correctly identified the situation as joyful than their peers the criterion group (see Figure 2).

Figure 2. The differences between the groups in the task "scene"

The difference between the groups in the identification of the mimic expression of the joy based on graphicalised scheme of facial expressions was significant χ^2 (1, $N = 60$) = 10.58; $p < 0.001$. The strength of the association between variables, $\Phi = 0.42$; $p < 0.001$, indicate the moderate correlation between the degree of intellectual disability and the correct identification of the joy. Children in the intellectual norm much more often correctly identified the emoticon of joy than their peers from the criterion group (see Figure 3).

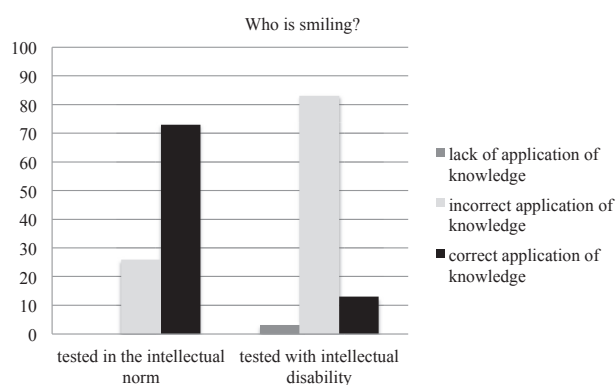**Figure 3. The differences between the groups in the task "emoticon"**
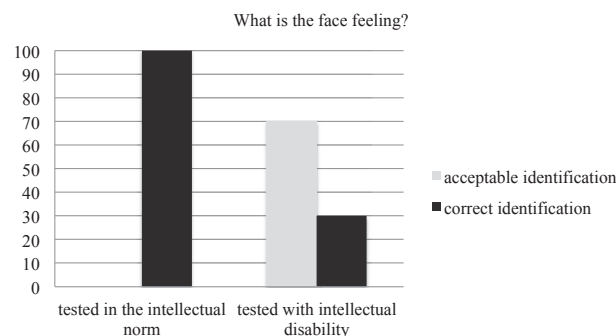
Analyses for the verbal code (function-expression)

Analysis with the t test for the independent groups showed that children in the control group reveal the richer knowledge about the joy in the directed conversation ($M = 3.77$; $SD = 0.5$) than children from the criterion group ($M = 2.64$; $SD = 1.08$), t (41.01) = 5.15; $p < 0.001$. The effect size (Cohen's $d = 1.61$) indicates a strong correlation between mental development and a wealth of presented knowledge about the joy.

In terms of disclosure of knowledge about the joy relating to causes and behavior, no differences between the groups were observed. Children with intellectual disability as often as children in the intellectual norm correctly ended the sentence concerning the cause "When someone wins the prize, then he/she feels…" and the sentence concerning the behavior "When someone smiles, then he/she feels…", pointing to the emotion of the joy.

The difference between the groups in terms of the application of socio-cultural knowledge is significant χ^2 (2, $N = 60$) = 22.22; $p < 0.001$. The strength of the association between variables, Cramer's $V = 0.61$; $p < 0.001$, indicates a strong correlation between the degree of intellectual disability and the correct use of socio-cultural knowledge about the joy. Children in the intellectual norm much more often correctly answered the question inspired by the proverb than their peers of the criterion group (see Figure 4).
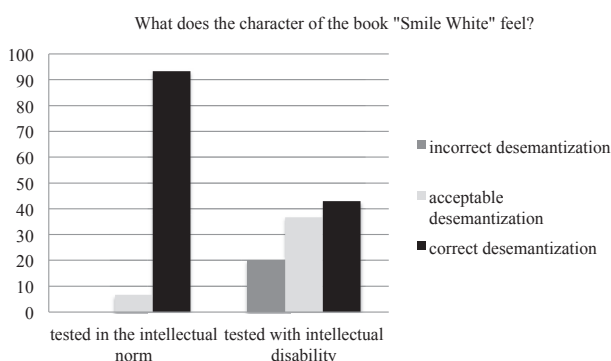
Figure 4. The differences between the groups in the task "proverb"

**Analyses for the abstract code (function-comprehension)**

The difference between the groups in terms of linguistic desemantization of metaphor of the joy is significant χ^2 (2, $N = 60$) = 17.72; $p < 0.001$. The strength of the association between variables, Cramer's $V = 0.61$; $p < 0.001$, indicates a strong correlation between intellectual disability and the correct reading of the linguistic metaphor. Children in the intellectual norm much more often correctly accomplished desemantization than their peers from the criterion group (see Figure 5).

Figure 5. The differences between the groups in the task "title"

The difference between the groups in terms of desymbolization of iconographic metaphor of joy is significant χ^2 (3, $N = 60$) = 22.91; $p < 0.001$. The strength of the association between variables, Cramer's $V = 0.62$; $p < 0.001$, indicates a strong correlation between intellectual disability and the correct reading of the visual metaphor. Children in the intellectual norm much more often correctly accomplished desymbolization than their peers from the criterion group (see Figure 6).

Figure 6. The differences between the groups in the task "iconographic"
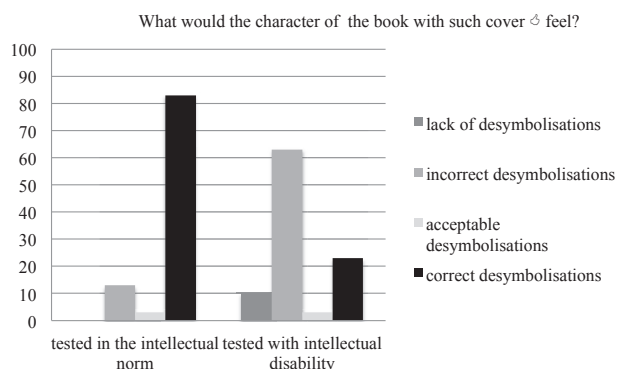
The difference between the groups in terms of symbolic association is significant χ^2 (2, $N = 60$) = 20; $p < 0.001$. The strength of the association between variables, Cramer's $V = 0.58$; $p < 0.001$, indicates a strong correlation between the degree of intellectual disability and the correct matching of visual and linguistic metaphors. Children in the intellectual norm much more often correctly accomplished symbolic association than their peers from the criterion group (see Figure 7).

Figure 7. The differences between the groups in the task "matching"
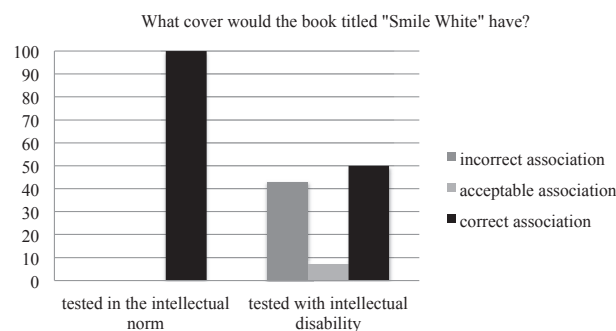
Discussion

The obtained results indicate both the presence and the lack of differences in the way of understanding the joy by the tested groups. Definitely, in all aspects of knowledge about the joy, children in the intellectual norm perform better. However, the results are largely determined by the level of organization of knowledge about the joy and the accompanying mental operations.

In terms of perception, especially in the tasks relating to the image code, the differences between children in the intellectual norm and children with mild intellectual disability were statistically significant. It should be noted, however, that they were mainly connected with differences between the correct and accessible identification, but not with the incorrect one. Despite the differences, children with mild intellectual disability correctly recognize the emotion of the joy in pictures and emoticons, and their main difficulty is the correct verbalization. These children often identified the joy by the expression of, for instance, a smile, not using the criterial, abstract or verbal label, which is characteristic for their specific development. The correctness of the identification of mimic expressions based on the graphical scheme of the face, despite its symbolization, can be associated with the practice of naming the experienced emotions with the use of the symbol of the face, which accompanies the child from the preschool education. Early training, concretization of a task, as well as its repeatability could bring such a good result. The results of the research relating to the recognition of emotions based on the situational context and behavior revealed greater differences between children in the intellectual norm and children with mild intellectual disability. The observed difference may be caused by the difficulty in linking the situational context with a given emotion, resulting from the achieved level of thinking which determines the difficulty of generalization of their knowledge, reasoning by analogy, rigidity of thinking leading to the use of well-known schemes in solving new

tasks. In the tasks from the area of verbal code, the strong relationship between the level of mental development and the wealth of presented knowledge about the joy were revealed by the results related to the task "conversation". The differences between children with mild intellectual disability and children in the intellectual norm is mainly caused by the range of knowledge and generalization of this knowledge depending on the different situational contexts, poor vocabulary and fluency. Children with mild intellectual disability have also problems with identifying correlations within one system of the signals (perception) in the other (verbalization), what results in the low level of interaction between these two systems and leads to the increased efficiency of receiving the information in the first system. Operative visualization causes the greater disorder of information, thereby lowering the level of perception (Gajdzica, 2007, pp. 70–71). In the task of completion of unfinished sentences, there were no significant statistical differences between the groups. It turned out that matching the words to the given semantic field was the task that children with mild intellectual disability coped with at the same level as children in the intellectual norm, which may be due to far-reaching concretization of sentences corresponding to the level of thinking of this group of children. It can, therefore, be concluded that when the subject of comparison is the knowledge coming from easily accessible premises with their sources in everyday experience of participants of the research (e.g. social situations or mimic expressions), it is possible to use concrete operations. Under such conditions, the test groups were slightly different. However, in the tasks where it is necessary to operate on the abstract material (e.g. identification of visual cultural codes) and use the adequate intellectual operations, then the groups of children with intellectual disability do much worse. In terms of the conceptual component of knowledge about the "joy" emotion, revealed statistically significant differences between children with mild intellectual disability and children in the intellectual norm were at a much higher level. The results of the task "proverb" revealed that children with mild intellectual disability do not have or cannot spontaneously apply the socio-cultural knowledge in the allusive situation. Under the abstract code, children with mild intellectual disability mainly answered in the wrong way. In the task "title", these children provided the wrong desemantization, referring the title mainly to the situations with the concrete. The similar situation occurred in the task "iconographic", when children with mild intellectual disability usually incorrectly desymbolized the emotions of the characters of the books. In the task "matching", the results revealed, in turn, the incorrect symbolic association of linguistic and iconic metaphor. The differences in the area of conceptualization of knowledge between children in the intellectual norm and children with mild intellectual disability are not only larger, but above all, on the other level of quality of this knowledge. Children with mild intellectual disability due to the available for them level of concrete thinking, did not coped with the tasks in the field of the abstract code which requires a higher level of

cognitive processing. Therefore, the answers provided in terms of the tasks related to the abstract code, were usually their simplification and the reference to the particular concrete situation, what made it impossible to answer correctly.

The concept of codes in emotion representation accepted in the research was confirmed empirically. This concept enables the developmental approach, according to which the achievement of the successive stages of cognitive development by the individual leads to a more sophisticated and flexible knowledge about the emotions (Maruszewski & Ścigała, 1995). The punctuality of developmental changes is associated with, for instance, the moment of speech acquisition or the achievement of the stage of abstract thinking. In children with intellectual disability the cognitive development is slowed down, which as a result contributed to the knowledge about emotions rich in specific elements. This also shows that in order to move between the codes and make continuous reinterpretation of the meanings and increase the access of the possessed knowledge, the advanced cognitive processes which constitute its structural element are necessary (cf. Stepień-Nycz, 2015, p. 37). The confirmation of the developmental aspect of the concept of emotion codes is the symptomatic model of understanding emotions manifested by children with intellectual disability (Nowakowska-Kempna, 2000, p. 366). This model says that the observable manifestations of emotions, such as mimicry, pantomimics or proxemics, are identified as the essence of the emotion. Because manifested expressions of emotions are perceptually easily accessible, in accordance with the principle of correspondence, the specific data recorded in the image code are recognized as a given emotion. The causative model is more advanced cognitively and indicates that the cause of emotion is the feature on the basis of which the individual builds his/her explanation concerning the correlation of particular elements of emotional experience. (Ahn, Kim, Lassaline & Dennis 2000; Jasielska, 2011, 2013; Siemer 2008). In the common understanding of emotions, the reason is considered to be a central feature combining particular features of the representation of emotions only when the individual has sufficiently developed inference processes that allow him/her to conclude that the joy, for instance, is provoked by (cit.) "reaching what is wanted" (the sample comment of a tested child in the intellectual normal), and not (cit.) "when I get a present" (the sample comment of a tested child with intellectual disability).

The offer of actions, so-called positive interventions, which aimed at lasting increase of the feeling of happiness is extremely rich (Kaczmarek, 2016). A number of them focus on, among others, evoking the positive emotions, including the joy, but however, with special regard to its reflective nature (Jasielska, 2014, p. 170). Therefore, practices promoted by the positive psychology, such as expressing the gratitude or training of reflective evaluation, will be rather inaccessible for children with intellectual disability. This is due to the fact that the knowledge of these children about the joy is based on the concrete data, so that

it slightly performs regulatory functions. In fact, it could be ensured that these children experience the joy automatically in homeostatic and hedonistic way. It is known, however, that the automatic joy, because of its universal nature and direct daily availability, affects the happiness of all people. It is, therefore, about arranging situations that give the joy for children through the restoration of homeostasis, for example solace in a situation of social risks or the care during illness. In the hedonistic way, it comes to arranging clear, causing the joy of the individual situations, such as a visit to an amusement park or a purchase of an item to the collection, and in-depth experience of the emotions of "here and now".

It is hard to expect that a child or an adult with intellectual disability can develop a system of reflective emotions which requires the development of abstract concepts related to values. This would entail, for instance, the fact that during the implementation of the self-standards, such person would feel the happiness and the joy by experiencing the hardships, which are important values in his/her life, and during the implementation of axiological standards (cit.) "the joy resulting from the improvement of the political situation in a country of a totalitarian regime" (Jasielska, 2014, p. 88). However, the activities that are aimed at building happiness in practice should not be overemphasized, because even the discussed study showed that there is the group of children with intellectual disability whose knowledge about the joy is comparable to the knowledge of their peers in the intellectual norm. Hence the premise as to implement techniques that build authentic self-esteem also in this group. (e.g. the dairy of successes or discovering the advantages, cf. Fennell, 2008, p. 105). It is worth considering, for example, to the extent available for a child, to encourage reflection "What kind of person would I like to be?" and, if possible, to support these efforts because the implementation of the own standards provides the joy (Jasielska, 2014, p. 184). It is also worth remembering that the emotional trainings for this group should be adequately prepared at the level of the concrete. Its effectiveness will also depend on the exercise of many specific examples which enable generalization of certain behaviors.

It seems that one of the strengths of the applied testing procedure is constructing a tool that enables to record the spontaneous behavior of the tested child which is close to his daily activities. The downside, however, is time-consuming of the research, which in some tested children with disability led to discouragement (cf. Pytel, 2016). Although the study in its design refers to three different codes of representation, they predominantly use the linguistic expression, which is a common phenomenon in studies on the emotional knowledge (cf. Gawda, 2007; Jasielska, 2013), but not the only one (cf. strategies recommended for measuring emotional scripts, Saarni, 1999, p. 149). For example, in the studies of metaphorical understanding of emotions it was used, among others, the drawing (Wiśniewska-Kin, 2009), and in the test of knowledge about emotions – the expression through the facial mimicry (Stępień-Nycz, 2015). These techniques unequivocally went beyond the linguistic picture of the world and their application can be considered as a workshop modification in the future studies. In addition, the individual differences in knowledge about the joy could be the new area of theoretical and empirical penetration. Because the development is equifinal (Trempała, 2011), only the analysis of individual trajectories of development would allow to determine, among others, to what extent the family environment or school education participate in the development of knowledge about the joy in children with mild intellectual disability.

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