

Knowledge about anger in children with a mild intellectual disability

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ABSTRACT

The knowledge of children with a mild intellectual disability (ID) is less complex and poorer than that of their peers in the intellectual norm (IN). The aim of this study was to characterize knowledge about anger in children with mild intellectual disabilities. The study used the authoring tool to measure children's knowledge of emotions, including anger. This tool facilitated the exploration of the cognitive representation of the basic emotions available in three codes (which perform the functions of perception, expression, and understanding) and the interconnections between them. Children in the intellectual norm (N = 30) and children with mild intellectual disabilities (N = 30) participated in the study. The results mainly indicated differences in how anger was understood by particular groups, to the detriment of children with a disability. The results were largely determined by the child's level of organization of knowledge about anger and accompanying mental operations.

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INTRODUCTION

One student in the third grade of primary school said that “anger can blow up as a storm” (Buchnat & Jasielska, 2022). Children have their opinions about anger because every emotion can be the subject of mental representation and be written in ways that differ from the conventional system of signs in the form of the concept of emotion, which in the given example was reflected in the metaphor above (Kövecses, 2020). It is therefore assumed that the 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 (Jasielska, 2013). Representations of emotions are present in mental space, which is dominated by abstract forms of recording and creating the individual’s knowledge about emotions. A question pertains to whether individuals with intellectual deficits share the same advanced knowledge about emotions as healthy individuals. The answer to this question, this investigation examines children with mild intellectual disabilities (ID) knowledge about anger.

Knowledge about emotions

According to Brenner and Salovey (1997, p. 176), knowledge about emotions can be defined as “information resources concerning self-experiencing the emotions and experiencing them by others, which can be used to understand and interpret the events taking place in the individual’s environment”. The elements of such knowledge include information about the origin of emotions, causative factors responsible for the emergence of a given emotion, the influence of emotions on behavior specific to a particular emotion, control and activation techniques, the connection of a given emotion with other emotions, the value of a given emotion in an individual system of meaning, the factors that determine their strength, duration, consequences, prediction of their course and more (Buchnat & Jasielska, 2022). With knowledge about emotions, people know why they are angry, how to behave in a situation where they are frightened, what to say when they are in love or recognize what brings them joy or frustration. We use this knowledge in conversations with people, in emails, and when reading a book. Therefore, people, also children are able to give meaning to their own emotions and the emotions of others (Conte et al., 2019).

The model of mental codes and the connections that exist between them (see the code-emotion concept posited by Obuchowski, 1982) is one form of emotional knowl-

edge discussed in previous literature (Karmiloff-Smith et al., 2018). The supplement to the above-mentioned approach is the concept of the mental representation of emotions, based on the triangulation of Odgen and Richards (1989) by Maruszewski and Ścigała (1998). According to these authors, knowledge about emotions is hierarchically organized based on images, verbal and abstract codes, and processes related to their transformations. As far as an image code is concerned, different people may react in different ways to the same situational stimulus. This is related to the fact that within this code, primitive, inaccessible scripting representations, filled with individualized content, are created. This code combines with a verbal code, in which the representation of emotions has a prototypal structure and contains characteristic, generalized knowledge of the emotions that are most often experienced in specific situations. Processes of semantization and desemantization are crucial in connecting the verbal code with the abstract code. The most generalized representation of emotions, which consists in giving meaning, arises precisely in the abstract code; moreover, emotions are represented as concepts that contain *a priori* knowledge in the form of colloquial theories of emotions. The abstract code is connected with the image code by symbolization and desymbolization. The individual codes and their reciprocal transformations, apart from the content aspect of emotional knowledge, also contain cognitive and instrumental activities that are stimulated within them. They comprise functions such as perception, expression, and understanding (conceptualization) of emotions. There is a common belief that a form of knowledge about emotions that encodes data in an abstract way and that uses complex thought processes is the one that affords the individual control over their emotions.

THE EMOTIONAL SPHERE OF CHILDREN WITH ID

In the case of people with ID, it is important to be aware of emotions just as this is true for people in the intellectual norm (IN), but given the former’s specific features of development, such knowledge may differ. People with ID are characterized by emotional and social maladjustment and a reduced level of intellectual functioning, rendering it difficult for them to implement complex processes such as generalization, abstracting, and comparing. They reveal simple and limited interests as well as low levels of initiative and a lack of originality. They generally manifest difficulties at the linguistic level, a short attention

span, and slow cognitive response. People with ID are characterized by low levels of compatibility between the content of their normal relationship knowledge and the actions of the dysfunctional procedure. Thus, these people reveal a disorganized and inadequate level of cognitive functioning from a constructivist perspective (Barbosa, 2007) and are characterized by lower self-esteem and greater emotional sensitivity, leading to difficulties in self-control and emotional self-regulation (Berkson, 1993).

Knowledge about emotions is organized on the basis of image, verbal and abstract codes, requiring the involvement of cognitive and instrumental activities such as perception, expression, and conceptualization (understanding), which are disturbed in the case of people with ID. Therefore, ID may determine one's ability to recognize emotions (Wishart et al., 2007).

Knowledge about emotions in children with mild ID may vary due to their differing levels of perception, expression, or conceptualization of this knowledge. When it comes to perception, we can talk about perceiving emotions and recognizing them on the basis of a specific image. Research conducted by Channell et al. (2014) revealed that people with mild ID recognize emotions from facial images at the same level as people in the IN. Numerous studies have examined how groups of children with ID recognize emotions based on images of static facial mimicry in the groups of children with ID (specifically with Down syndrome) recognize emotions based on images of static facial mimicry, but the results obtained have been unclear. Some studies have revealed that such children struggle to recognize emotions like fear, anger, and surprise (Cebula et al., 2010; Porter et al., 2007; Wishart et al., 2007), sadness, surprise, shame (Hippolyte et al., 2008; Hippolyte et al., 2009), and anger (Gonçalves et al., 2013). However, the research conducted by Carvajal et al. (2012) confirmed Channell et al.'s (2014) results that they do not encounter problems in recognizing emotions.

The research conducted by Kasari et al. (2003) on other social and emotional competencies revealed lower levels of empathy than people in the IN. People with mild ID are able to identify emotions shown by other people (Moore, 2001), but unfortunately, their rigid forms of thinking, tendency to make mistakes connected with logic, and inability to make generalizations or abstractions cause a low level of understanding emotions. Disorders in abstract thinking and the process of decentration lead to significantly reducing one's ability to understand another's emotions and situations. Only long-term training

in empathy allows people with mild ID to understand the subjectivity of feelings and their situational context (Simeonsson & Bailey, 1988).

Due to their reduced linguistic development, especially in terms of verbal understanding (Ronald, 1989), people with ID may manifest difficulties in areas of knowledge about emotions in the verbal code. Research conducted by Thirion-Marissiaux and Nader-Grosbois (2008) has revealed difficulties in understanding the consequences of anger. Nevertheless, a limited ability to express verbal emotions does not necessarily imply a lack of understanding (Gonçalves et al., 2013). For example, Kowsalya et al. (2012) constructed a scale to assess emotional maturity in mild intellectually disabled children.

Children's emotions arise under the influence of consciousness in the exchange of gestures, looks, feelings, and experiences and are expressed by affective behaviors belonging to different sensitivities. However, in the case of people with ID, they can be expressed in a selective manner (Guhur, 2007).

The results of previous research indicate that people with mild ID recognize their own emotions (Lindsay et al., 2004) at a similar level as people in IN, especially in terms of a simple division into pleasant and unpleasant emotions, but problems start to appear when identifying specific emotions (Moore, 2001).

ANGER, THE EXEMPLIFICATION OF NEGATIVE EMOTIONS, ALSO KNOWN AS "EMOTION AGAINST SOMEBODY"

Anger belongs to the group of basic, object-independent, universal emotions with clearly negative valence. It is caused in the individual perspective by "active goals frustrated" (Oatley, 2004, p. 79) or the core relational theme "a demeaning offense against me and mine" (Lazarus, 1994, p. 164) and initiates the plan in the individual "try harder, strive forcefully" (Oatley, 2004, p. 79). There is also the social perspective, in which the social goal for anger is "insult, loss of respect or status" and the social plan and relationship commitment script are "retaliate aggressively, fight" (Oatley, 2004, p. 80).

Anger regulates interpersonal and social behaviors and an inappropriate expression and regulation of anger have social and clinical implications (Harmon-Jones & Harmon-Jones, 2016). As an interpersonal emotion, anger configures relationships into a distinctive mode identified as conflict (Oatley, 2004) and it is likely that violence and aggression are anger-infused. On the one hand, anger, like every basic emotion, is a unique mechanism that

cannot be decomposed into anything else. On the other hand, anger is divided into two types: “hot” as rage and “cold” as irritation (Banse & Scherer, 1996). Additionally, alongside contempt and disgust, anger forms one part of the hostility triad (called the CAD triad; Rozin et al., 1999).

The constructive model of emotions assumes that knowledge about emotions is a significant element in creating the emotional experience (Barrett, 2017). The experience of emotions is the act of categorizing affective experiences, driven by embodied knowledge about emotions. In this perspective, emotions are like acts of perception involving the interpretation of dynamic sensory data using data storage and conceptual system (Barrett, 2017). This conceptual system is stored in memory-based knowledge about the emotion, which persists in language, shaped by previous experiences. The system is rich in contextually specific concepts of particular emotions. Thus, the individual does not have just one concept such as anger, but the collection of interpretations that he/she can adapt in varied and flexible ways.

One’s cognitive processes and level of intellectual ability or disability can affect one’s experience of anger through knowledge of it. Therefore, in this study, participants were drawn from children with mild ID and children in the IN, with the aim of comparing knowledge about anger manifested within the three codes (image, verbal and abstract) and applied within the three functions (perception, expression, and understanding). It was assumed that the developmental limitations of children with mild ID would result in less extensive knowledge about emotions, requiring the involvement of cognitive and instrumental actions that are disturbed in these children.

The study was based on the theoretical proposal about the three codes of mental representation of emotion, which was used successfully in previous studies of the emotional knowledge of Polish children in the IN (Górecka-Mostowicz, 2005; Stępień-Nycz, 2015).

RESEARCH METHODS

Participants

When selecting participants for the survey, the following criteria were taken into account: having been evaluated for special education needs because of mild ID (“mild mental retardation” is a valid terminology in the evaluation); lack of couplings; the prevalence of diagnosed movement, sensory or autism spectrum disorders; and from the town (over 20,000 inhabitants) in Greater Poland Voivodeship. The lack of couplings criterion was

used to limit additional factors affecting the emotional functioning of a child. For children selected from the Educational Information System database, 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 provide information about the child to confirm their degree of ID and the presence of additional couplings (or their absence). Having obtained the consent of the school principal to conduct the research and having confirmed the children’s compliance with the criteria, the parents or legal guardians were asked for their consent to participate in the research. The total study involved 30 students with mild ID, including 15 girls and 15 boys aged eight or nine ($M = 8.72$; $SD = 0.44$). The participants in the control group comprised 30 students in the IN enrolled in general education in the town (over 20,000 inhabitants) in Greater Poland Voivodeship. There were 15 girls and 15 boys aged eight to ten in this group ($M = 8.81$; $SD = 0.44$) [$t(58) = 0.84$; $p = ns$].

Material

To measure the children’s knowledge about anger, we used the tool WE06, consisting of nine tasks requiring open and closed answers (Buchnat & Jasielska, 2018). The entire battery is used to measure knowledge of six basic emotions. This article presents the part of the research concerning the emotion of anger. Particular tasks by which to measure knowledge about anger are presented in Table 1 while accompanying visual materials are presented in the appendixes.

[Insert Table 1 about here]



Procedure

The survey was conducted during two meetings, the length of which depended on the pace of the participating child’s work. On each testing day, the tasks performed by the child were represented by each of the three codes: image, verbal and abstract. Each task was first demonstrated to the child as an example, in order to ascertain whether he or she understood the instruction correctly. During the first meeting, the child performed the following tasks: emoticon, scene, conversation, and title. On the second day, he or she accomplished these tasks: photo, opinion, iconography, proverbs, and matching. During the directed conversation, the responses were recorded using a dictaphone and then transcribed.

Measures

Due to the fact that in most of the tasks (except the proverb task) the answers given by the participants were

Table 1. Battery of tasks used to measure the particular processes and codes regarding knowledge about anger

Code/function	Process	Task	Measure
Image code/perception	Identification of mimic expression from a photo (Appendix A)	"Picture" ^a : A photo of a boy is presented; the participant answers the question, "What is the baby in the picture feeling?"	Answers were classified as follows: 1. Lack of identification (no response); 2. Incorrect identification (e.g. thinking) or too general (e.g. feels bad); 3. Acceptable identification (e.g. furrowed eyebrows) or negation (e.g. not joy); 4. correct identification and synonyms (e.g. irritation).
	Recognition of emotions based on situational context and behaviour (Appendix B)	"Scene" ^b : A cartoon scene of is presented; the participant answers the question, "What is the boy feeling?"	
	Identification of mimic expressions based on the graphical scheme (Appendix C)	"Emoticon" ^c : A graphical scheme is presented; the participant answers the question, "What is the face feeling?"	
Verbal code/expression	Disclosure of knowledge about emotions; defining names	"Conversation" ^c : Conducted with the participant here was a structured conversation containing 5 questions, e.g. "What does the word 'anger' mean?", "What comes to your mind when you hear this word?"	For every accurate answer, the participant received 1 point. result min = 0 max = 5.
	Matching words with the given semantic field	"Sentences" ^c : The participant is asked to complete an unfinished two sentences about: - the cause of anger - the behaviour being an expression of anger	Answers were classified as follows: 1. Lack of matching; 2. Incorrect matching or too general; 3. Acceptable matching or negation; 4. Correct matching and synonyms.
	Applying socio-cultural knowledge	"Proverb" ^a : The participant selects the correct answer from three options, "What does the beauty harm?" : a. "Anger"; b. "No makeup"; c. "Bad nutrition"	Answers were classified as follows: 1. Lack of application of knowledge; 2. Incorrect application of knowledge; 3. Correct application of knowledge.
Abstract code/understanding	Desemantization of linguistic metaphor	"Title" ^b : The cover of a book with the title <i>Rebellious dwarf</i> is presented, whose task is to determine the emotion experienced by the protagonist	Answers were classified as follows: 1. Lack of desemantization; 2. Incorrect desemantization or general; 3. Acceptable desemantization; 4. Correct desemantization and synonyms.
	Desymbolization of iconographic metaphor	"Iconography" ^c : A book cover with the iconographic  is presented to the participant, whose task is to determine the emotion experienced by the protagonist.	Answers were classified as follows: 1. Lack of desymbolization; 2. Incorrect desymbolization or general; 3. Acceptable desymbolization or negation; 4. Correct desymbolization and synonyms.
	Symbolic association of linguistic and iconographic metaphor	"Matching" ^a : A book cover with the iconographic  (among others) is presented to the participant, who has to choose the cover of the correct book title; in the case of angry, <i>Rebellious dwarf</i> .	Answers were classified as follows: 1. Lack of association; 2. Incorrect association; 3. Acceptable association; 4. Correct association.

^a Author's task; ^b Task of Górecka-Mostowicz (2005); ^c Task inspired by Górecka-Mostowicz (2005)

open, three competent judges were asked for their assessments. The judges, comprising psychologists and special educators, applied the criteria presented in Table 1. The agreement between the judges was satisfactory: Kendall's_{min} Tau-b = 0.83; $p < 0.001$ – 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 terms of their identification of the mimic expression of anger in the picture $\chi^2 (2, N = 60) = 8.00$; $p < 0.05$. The strength of association, Cramer's $V = 0.36$; $p < 0.05$, indicated a moderate correlation between the degree of ID and the correct identification of anger. Children in the IN much more often correctly identified the anger mimic expression than their ID peers (Figure 1).

The difference between the groups in terms of their identification of anger based on the situational context and behavior shown in the cartoon scene was insignificant. Children with ID and their IN peers correctly identified the situation.

The difference between the groups in terms of their identification of the mimic expression of anger based on the graphical scheme of facial expressions was also insignificant. Children in the IN and their ID peers correctly identified the emoticon representing anger.

Analyses for the verbal code (function expression)

Analysis with the t -test for the independent groups showed that children in the IN exhibited richer knowledge about anger ($M = 3.7$; $SD = 0.53$) than children with ID ($M = 2.01$; $SD = 1$, 31), $t (38.35) = 6.52$; $p < 0.001$. The effect size (Cohen's $d = 2$.) indicated a strong correlation between the level of mental development and knowledge about anger.

In terms of disclosure of knowledge about anger relating to causes and behavior, no differences between the groups were observed: children with ID correctly ended the sentences concerning causes and behavior as often as children in the IN.

The difference between the groups in terms of the application of socio-cultural knowledge was significant $\chi^2 (2, N = 60) = 8.51$; $p < 0.05$. The strength of the association, Cramer's $V = 0.38$, $p < 0.05$, indicated a strong correlation between the degree of ID and the correct use of socio-cultural knowledge about anger. Children in the IN much more often correctly answered the question inspired by the proverb than their ID peers (Figure 2).

Analyses for the abstract code (function understanding)

The difference between the groups in terms of the linguistic desemantization of the metaphor of anger was significant $\chi^2 (2, N = 60) = 21.82$; $p < 0.001$. The strength of the association, Cramer's $V = 0.6$, $p < 0.001$, indicated

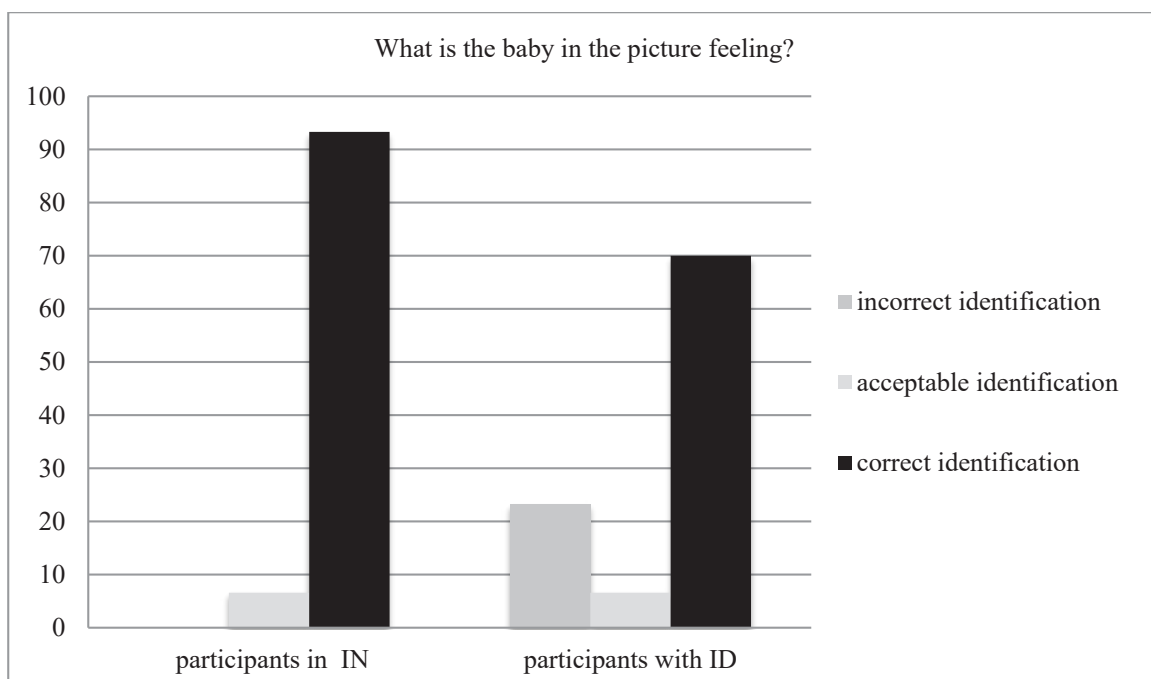


Fig. 1. Differences between the groups in the task "Picture"

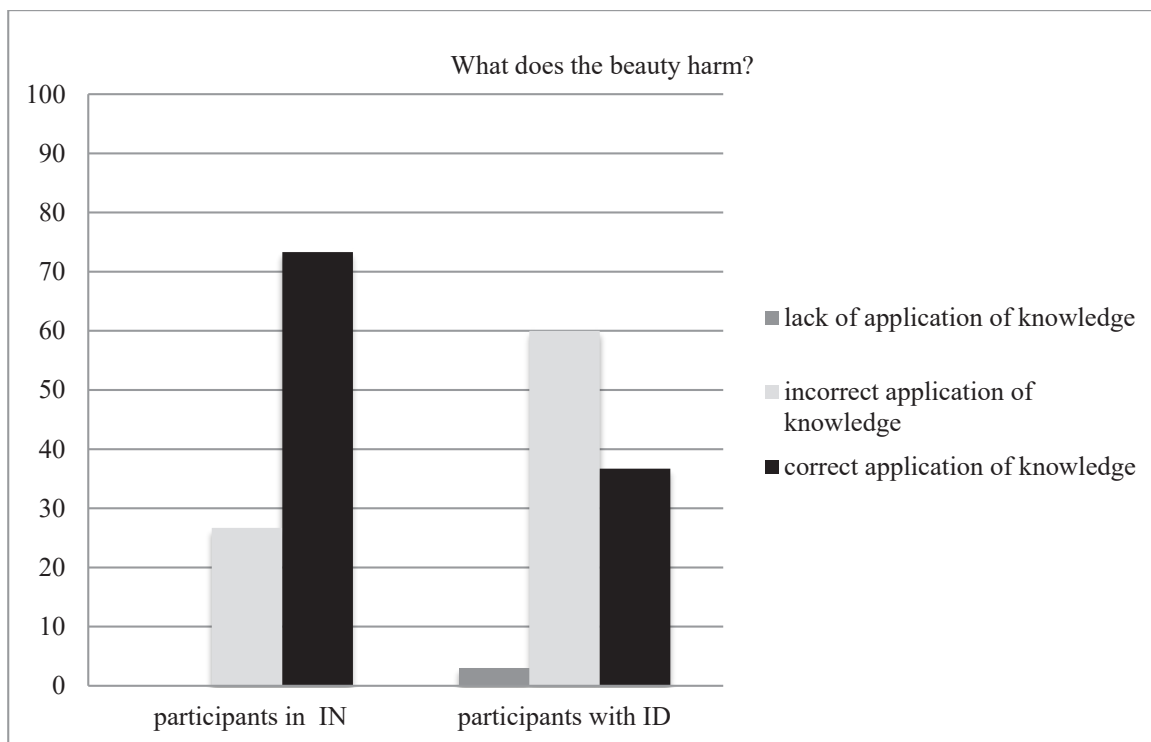


Fig. 2. Differences between the groups in the task "Proverb"

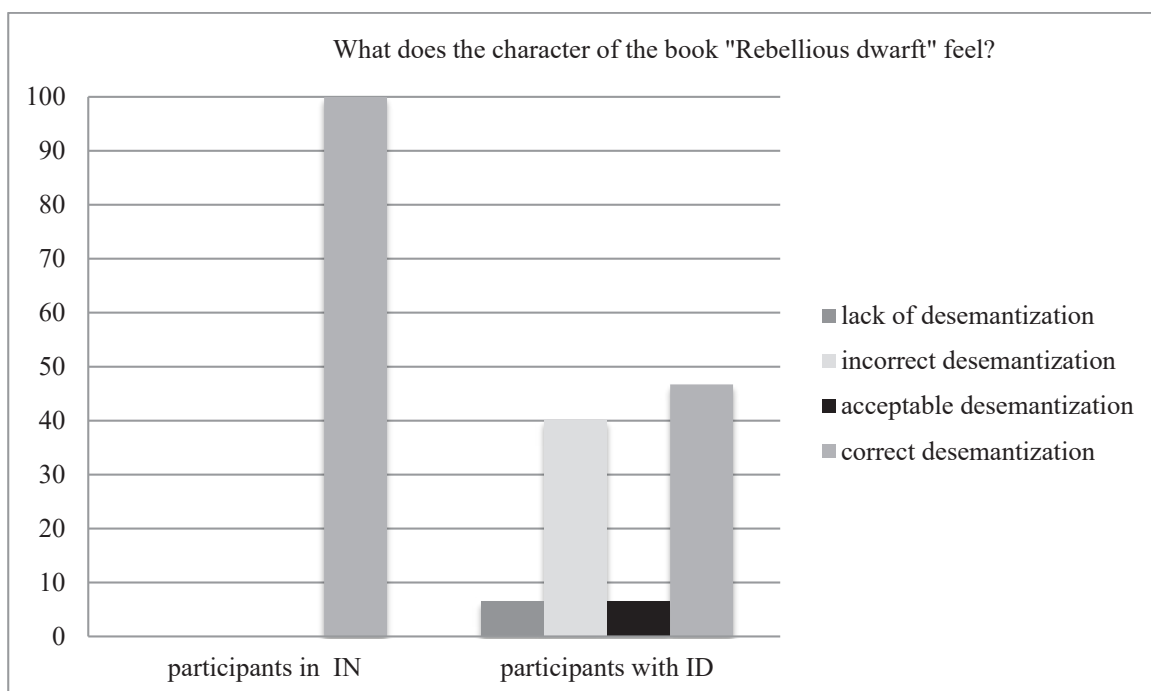


Fig. 3. Differences between the groups in the task "Title"

a strong correlation between the degree of ID and the correct reading of the linguistic metaphor. Children in the IN much more often accomplished desemantization than their ID peers (Figure 3).

The difference between the groups in terms of the desymbolization of the iconographic metaphor of anger was significant $\chi^2(2, N = 60) = 36.74; p < 0.001$. The strength of the association between the variables, Cramer's $V =$

0.78, $p < 0.001$, indicated a strong correlation between the degree of ID and the correct reading of the visual metaphor. Children in the IN much more often accomplished desymbolization than their ID peers (Figure 4).

The difference between the groups in terms of symbolic association was significant $\chi^2(2, N = 60) = 19.76; p < 0.001$. The strength of the association between the variables, Cramer's $V = 0.57, p < 0.001$, indicated a strong

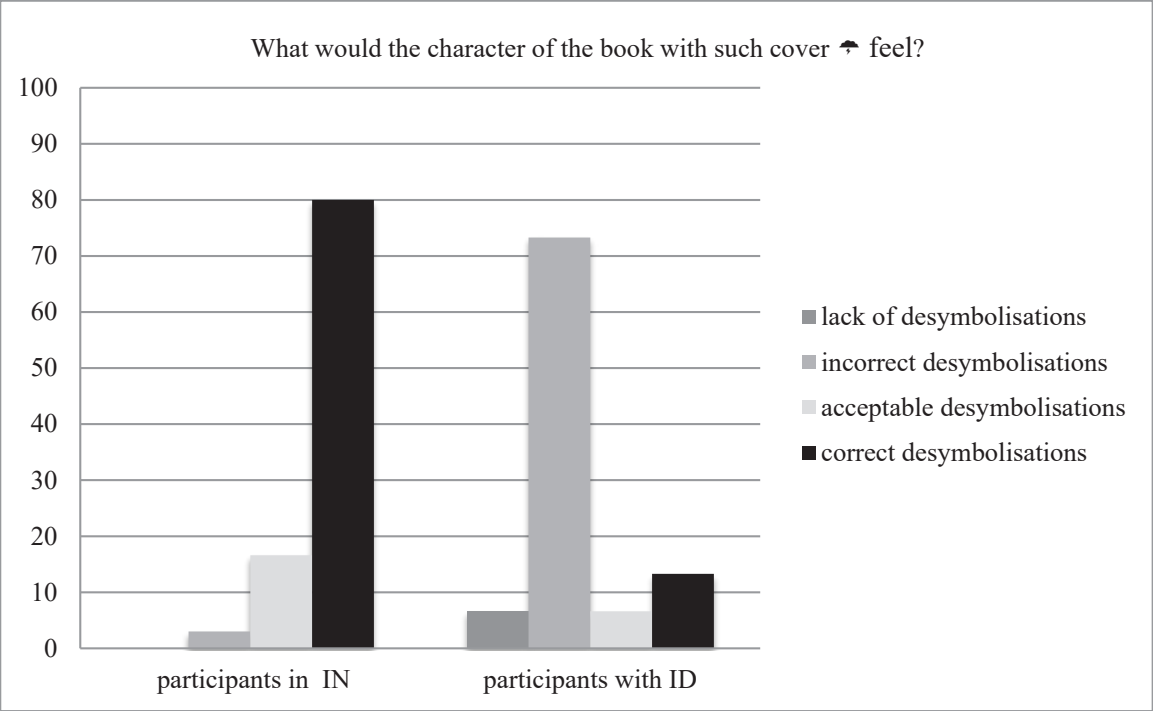


Fig. 4. Differences between the groups in the task “Iconography”

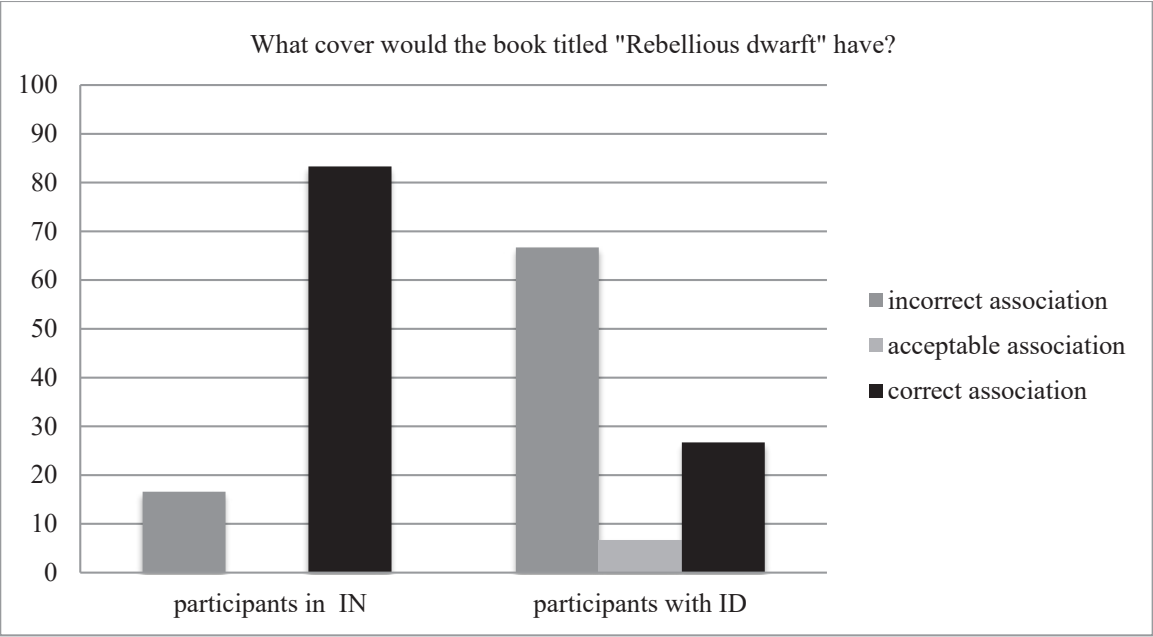


Fig. 4. Differences between the groups in the task “Iconography”

correlation between the degree of ID and the correct matching of visual and linguistic metaphors. Children in the IN much more often achieved symbolic association than their ID peers from the criterion group (Figure 5).

DISCUSSION

The results indicated both the presence and the absence of differences in knowledge about anger among the groups. In all of the different aspects of knowledge about

anger, children in the IN performed better. The author’s tools were designed to include an equal number of tasks for each code or function. Three tasks were dedicated to each of the three levels of knowledge organization, termed a “cylinder structure” (3: 3: 3) (Buchnat & Jasiełska, 2018). The way the tasks were carried out by children with ID reflected a “funnel structure” (2: 1: 0). The children with ID correctly performed most of the tasks in the image code, but fewer in the verbal code and none in the abstract code.

In terms of the image code, children with ID performed two of the three tasks with the same level of effectiveness as children in the IN. The subjects correctly recognized facial expressions based on emoticons and identified the situational context and behaviors associated with anger. Both tasks used cartoon material (appendix B and C), chosen as a means of facilitating the perceptions of children of early school age. During this period, this representation of reality is extremely popular (animated films, computer games, and comics; Carlisle, 2009). The perceived material is close to the experience of the individual because the graphical scheme of the face accompanies the child from preschool education when he or she undergoes specific training in naming the emotion experienced using a facial symbol (Rosset et al., 2008). Thus, early, homogeneous, serial training based on numerous attempts and using well-known material and the concretization of tasks yielded a positive result here.

Better identification of anger on the basis of a photo of a face was recorded in children in the IN. This task may have proved difficult for children with ID because the photograph shows the static, silent face of a boy, taken out of situational context and figure (Appendix A). Studies using a static face of an adult (e.g. a black-and-white photograph of a face; Wishart et al., 2007) or a dynamic child's face (e.g. brief video clips; Channell et al., 2014) have revealed that children with ID can recognize emotions just as well as children in the IN. Perhaps a distinctive feature of the study presented here was its use of static facial expressions of a child. On the other hand, various studies have identified problems in recognizing certain emotions, including anger (Porter et al., 2007; Wishart et al., 2007). This phenomenon has been called the emotion specificity hypothesis (Barisnikov et al., 2021) and highlights how visual affective information may be especially difficult for people with ID to process, a shortcoming that cannot be fully explained by mental age, but rather by a kind of emotion.

In the sentences for the verbal code, only one of the three tasks was performed equally well by the children with ID and the children in the IN. In the task of completing unfinished sentences about causes and manifestations of anger, all subjects easily matched the words to the given semantic field. Indeed, when the subject of a study is knowledge deriving from readily accessible contexts that have their source in the daily experiences of research participants (e.g. social situations), it is possible to apply the availability heuristic and use specific operations.

However, in the task in which the subjects were expected to demonstrate extensive knowledge about anger in the form of free answers to the questions presented,

a strong relationship was observed between the level of mental development and knowledge. The discrepancy between the study groups in terms of knowledge about anger was probably the result of a lower ability to generalize, decontextualize and transfer knowledge (Lave & Gomes 2019), due to inferior vocabulary and verbal fluency in children with mild ID. Poor vocabulary, especially emotional (and thus abstract) vocabulary, can significantly hinder the verbalization of knowledge. Problems with free speech may also result from the simultaneous cognitive (e.g. understanding the question), and verbal load (e.g. discourse) of children with ID (Moore, 2001).

Deficits in understanding result in children with mild ID being unable to spontaneously apply socio-cultural knowledge in an allusive situation, as required in order to interpret or use proverbs. This impossibility seems obvious, as one of the basic measures of the diagnostic executive functions of generalization and abstraction is the interpretation of commonly known metaphors or proverbs (Torralva et al., 2009).

In terms of the abstract code, all of the tasks performed by children with mild ID were flawed due to their levels of specific thinking and deficits in advanced cognitive processes. Indeed, they made the wrong desemantization, desymbolization, and metaphorical associations. Differences in the area of conceptualization of knowledge about anger between children in the IN and children with mild ID were found to be significantly greater than at previous levels of knowledge organization.

The knowledge of children with ID not only differs processual or operationally, but also in terms of quality and content. The knowledge of children with a mild disability regarding anger is characterized by specific, perceptually, and analogically accessible information: to a large extent, it is a simplification and recording of the actual state. For instance, for a graphical symbol of anger, one child replied that the heroine of the book "would be afraid of the storm".

The concept of codes of emotion representation adopted in this study was empirically confirmed. This concept facilitates a developmental approach according to which the individual's achievement of subsequent stages of cognitive development leads to the possession of more extensive and flexible knowledge about emotions (Maruszewski & Ścigała, 1998). Such punctuality of developmental changes is associated, among others, with the moment of acquiring speech, effective management of attention resources, and reaching the stage of abstract thinking (Maruszewski & Ścigała, 1998, pp. 88–89). Particularly critical is the ability to undertake abstract thinking, as it allows for: 1) decentration, thanks to which information

about the emotions of other people can be included in the knowledge of emotions; and 2) self-reflection, thanks to which it is possible to launch strategies of emotion control. Cognitive development in children with ID is slowed down, which in turn contributes to having inferior knowledge of anger, abundant with concrete elements.

In order to reinterpret meanings and increase the availability of knowledge, advanced cognitive processes are necessary, which at the same time constitute its structural element. Confirmation of the developmental aspects of the concept of emotion codes is manifested by children using the ID symptomatic model of understanding emotions. This model shows that observable manifestations of emotions such as mimics, pantomimes, or proxemics are identified with the essence of a given emotion. Given that the manifestations of emotions are readily perceptually accessible, these specific data recorded in the image code, in accordance with the principle of correspondence, are considered to be a given emotion. More cognitively advanced is the causative model, according to which the reason behind emotions is the property on the basis of which the individual explains his/her correlations of particular elements of emotional experience (Díaz, 2022; Rhodes & Baron, 2019). In the popular understanding of emotions, the cause is considered to be the central feature that combines the particular characteristics of emotion representation only when the individual has sufficiently developed inference processes. The causal model is more often used by children in first grade and less frequently by pre-schoolers, clearly indicating a delay in the thinking of children with ID in this area (Stein & Levine, 1989; Paviat et al., 2016). The dominant feature in the knowledge about the anger of children with ID was the presence of aggressive content. The children often identified anger in terms of screaming, hitting, arguing or fighting. Such representations may indirectly indicate difficulties in controlling anger in this group of subjects, although for the moment it is pure speculation, rendering further research necessary (McWilliams et al., 2014).

The wealth of details in knowledge about anger results from the greater availability of given data expressed in a monoconcrete code organized on the basis of "experience statistics". Reduced vocabulary makes it impossible to use a policoncrete code organized according to linguistic rules. In turn, hierarchical, conceptual coding is not available due to a weakened abstracting process (Obuchowski, 1982).

Referring to the concept of Rosch (1978), it can be seen that children with ID use a subordinate hierarchical organization of the concept of anger and other emotions

(Buchnat & Jasielska, 2018; Jasielska & Buchnat, 2017). This level abounds with descriptive data, but informativity prevails over the cognitive economy, which cannot be fully implemented due to weakened abstraction. The importance of the various stages of the abstraction process is also mentioned in the concept of Ohnuki-Tierney (1981). The author assumes that human cognition is realized through the processes of *perception* (the observation of sensory data), *symbolization* (the use of linguistic expressions), and *conceptualization* (i.e. cognition, based on inference processes). The knowledge of children with ID about emotions may remain at the pre-conceptual stage and be characterized by elements of perceptual cognition, whereas the knowledge of their peers will undergo further phases of the abstraction process as they develop.

It should be noted that there is a group of children with mild ID whose knowledge of anger is at a level comparable to that of their peers in the IN. Another group comprises children whose knowledge about anger is not harmonious, being correct in some areas, whereas in others it is sufficient.

The purposefulness of research on the emotions of children with ID has been suggested by McClure et al. (2009, p. 42) when describing emotion regulation and ID: "measurement tools should also address or be applicable to a variety of different emotions, as in the case of anger, where tools that reliably assess this emotion are lacking". Thus, the idea exists to develop an authoring tool to measure knowledge about basic emotions (Buchnat & Jasielska, 2018).

One of the assets of the applied research procedure is to construct a tool that allows one to record subjects' spontaneous behavior, similar to their daily activity. However, its downside is the time-consuming nature of the research, which in some children with ID may lead to discouragement. Although the research refers to three different codes of representation in its design, it mostly uses linguistic expressions, as is common in studies of emotional knowledge, although there are some exceptions (cf. strategies recommended for measuring emotional scripts; Saarni, 1999). Future studies might consider the use of techniques that go beyond the linguistic image of the world (Moore et al., 2014). Another area of theoretical and empirical penetration could be the presence of individual differences. As the development has an equifinal character, only an analysis of individual development trajectories would allow us to determine, among others, the extent to which the family environment or school education affects the development of knowledge about anger in children with mild ID.

IMPLICATIONS FOR PRACTICE

The obtained results of the research allow indicating important, though preliminary implications for teachers or psychologists working with children with ID. The starting point is to focus on limited knowledge of emotions in the verbal code. Due to the low vocabulary and reduced verbal fluency in children with ID, it would be recommended to expand the emotion lexicon. It is primarily about practicing the use of emotionally specific, varied vocabulary in a situational context. Another implication concerns broadening the knowledge about emotions in the abstract code, taking into account the cognitive limitations of children with ID. It seems to be particularly important due to the difficulties in generalizing, abstracting, and decontextualizing knowledge. With appropriate support, these children could probably enrich their knowledge about this emotion in accordance with the sphere of the nearest development (Vygotsky, 1986) and formulate even partial abstract concepts, albeit on a concretized basis. Nevertheless, there is a group that manifests a significant lack of knowledge about anger. Regardless of the level of knowledge, based on the relationship between declarative memory (knowledge about anger) and procedural knowledge (e.g., strategies for dealing with anger), our proposal for social practice would be the offer of psychoeducational interventions. Such interventions would involve the development of specific knowledge about anger, which in the short term could result in an ability to cope with anger and later lead to the elimination of (for example) aggressive behaviors (McWilliams et al., 2014), replacing them with assertive ones (McClure et al., 2009). Such initiatives have been successfully undertaken, among others on the basis of cognitive-behavioral therapy (Pearson et al. 2019; Stallard, 2019). Psycho-corrective activities focused on knowledge about emotions in the form of so-called emotional schemas (Leahy, 2015) may contribute to more effective strategies for regulating emotions. As for children with mild ID, interventions should be systematic, with plenty of repetitions, based on particular material and enhanced through instruction (Stewart & Singh, 1995), enabling the children to internalize the scripts of activities. However, the implementation of such requires the definition or concretization of abstract concepts that dominate in naming emotions and combining them with a specific situational script.

The third implication is the proposal to precede prevention programs aimed at reducing violence and aggressive behavior among children, and adolescents with ID, such as Aggression Replacement Training, ART, developed by Goldstein, the A Curriculum for Children's Effective

Peer and Teacher Skill program, ACCEPTS, with activities on expanding the knowledge about emotions such as anger. The aim of these activities would be to concretize knowledge about emotions, mainly in the image code, so that children with ID would better read this emotion in themselves, but also in other people, which could support the effectiveness of prevention programs reducing aggression and violence and supporting their social functioning.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The main limitation of the study was the recruitment of children who were identified as a homogeneous group, although the cause of their ID may vary. Therefore, the conclusions drawn are not very specific in relation to the various genesis of ID. Another limitation is the small number of participants, which suggests its exploratory nature. Despite the small group, the obtained results encourage future replications of the research on larger, heterogeneous groups.

The weakness of the study is also the fact that the tasks constituting the tool were new to the participants of the study and their execution was time-consuming, which in the case of children with ID could lead to excessive cognitive load and consumption of attention resources resulting in excessive distraction, despite the fact that the obtained results do not indicate this. Therefore, they should be treated with considerable caution.

We believe that further research is needed, not only regarding the knowledge about the emotions of children with ID and its specificity but also because of its importance in increasing the effectiveness of psychoeducational activities. In further research, an in-depth diagnosis of ID should be carried out during the recruitment of children for the study, and also a sociodemographic interview regarding data from the family of origin should be conducted. It seems that these factors may be crucial for the manifestation of specific knowledge about emotions. It would also be encouraging to carry out longitudinal research and capture the changes in the area of knowledge about emotions.

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REFERENCES

- Banase, R., & Scherer, K. (1996). Acoustic profiles in vocal emotion expression. *Journal of Personality and Social Psychology*, 70, 614–636.
- Barbosa, J. N. (2007). *Problemas mentais: Identificação e intervenção educativa*. [Mental problems: Identification and educational intervention]. Vila Nova de Gaia Instituto Piaget.
- Barisnikov, K., Thomasson, M., Stutzmann, J., & Lejeune, F. (2021). Sensitivity to Emotion Intensity and Recognition of Emotion Expression in Neurotypical Children. *Children (Basel, Switzerland)*, 8(12), 1108. <https://doi.org/10.3390/children8121108>
- Barrett, L. F. (2017). *How emotions are made: The secret life of the brain*. Boston: Houghton Mifflin Harcourt.
- Berkson, G. (1993). *Children with handicaps: A review of behavioral research*. New Jersey: Lawrence Erlbaum.
- Brenner, E. M., & Salovey, P. (1997). Emotional regulation during childhood: Developmental, interpersonal, and individual considerations. In: P. Salovey & D.J. Sluyter (Eds.), *Emotional development and emotional intelligence* (pp. 168–195). New York: Harper Collins.
- Buchnat, M., & Jasielska, A. (2018). Pakiet zadań wymagających zastosowania wiedzy o emocjach podstawowych-WE06. [The package of tasks requiring the application of knowledge about basic emotions-WE06]. *Niepełnosprawność*, 30, 377–401.
- Buchnat, M., & Jasielska, A. (2022). *Wiedza dzieci i młodzieży z niepełnosprawnością intelektualną o emocjach*. [The knowledge about emotions in children and adolescents with mental disability]. Poznań: Difin.
- Carlisle, R. P. (Ed.). (2009). *Encyclopedia of play in today's society*. Thousand Oaks, A SAGE Reference Publication. <http://dx.doi.org/10.4135/9781412971935.n156>
- Carvajal, F., Fernández-Alcaraz, C., Rueda, M., & Sarrión, L. (2012). Processing of facial expressions of emotions by adults with Down syndrome and moderate intellectual disability. *Research in Developmental Disabilities*, 33, 783–790. <https://doi.org/10.1016/j.ridd.2011.12.004>
- Cebula, K. R., Moore, D. G., & Wishart, J. G. (2010). Social cognition in children with Down's syndrome: challenges to research and theory building. *Journal of Intellectual Disability Research*, 54, 113–134. <https://doi.org/10.1111/j.1365-2788.2009.01215>
- Channell, M. M., Conners F. A., & Barth J. M. (2014). Emotion knowledge in children and adolescents with Down syndrome: A new methodological approach. *American Journal on Intellectual and Developmental Disabilities*, 119, 405–421. <http://doi.org/10.1352/1944-7558-119.5.405>
- Conte, E., Ornaghi, V., Grazzani, I., Pepe, A., & Cavioni, V. (2019). *Emotion Knowledge, Theory of Mind, and Language in Young Children: Testing a Comprehensive Conceptual Model*. *Frontiers in Psychology*, 10, 2144. <https://doi.org/10.3389/fpsyg.2019.02144>
- Díaz, R. (2022). What Do People Think Is an Emotion? *Affective Science* 3, 438–450. <https://doi.org/10.1007/s42761-022-00113-w>
- Gonçalves, Pereira, C. M. & Matos Faria, S. M. (2013). Emotional Development in Children with Intellectual Disability — A Comparative Approach with “Normal” Children. *Journal of Modern Education Review*, 3(2), 120–135.
- Górecka-Mostowicz, B. (2005). *Co dzieci wiedzą o emocjach* [What children know about emotions]. Kraków: Wydawnictwo Naukowe UP.
- Guhur, M. L. (2007). A manifestação da afetividade em sujeitos jovens e adultos com deficiência mental: Perspectivas de Wallon e Bakhtin [The affective level of young people with intellectual disability and adults: Wallon's and Bakhtin's perspectives]. *Revista Brasileira de Educação Especial*, 13/3, 381–398. <http://dx.doi.org/10.1590/S1413-65382007000300006>
- Harmon-Jones, E., & Harmon-Jones, C. (2016). Anger. In: L. F. Barrett, M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotion* (pp. 774–791). New York: The Guilford Press.
- Hippolyte, L., Barisnikov, K., & Van der Linden, M. (2008). Face processing and facial emotion recognition in adults with Down syndrome. *American Journal on Mental Retardation*, 113, 292–306. [https://doi.org/10.1352/0895-8017\(2008\)113292](https://doi.org/10.1352/0895-8017(2008)113292)
- Hippolyte, L., Barisnikov, K., Van der Linden, M., & Detraux, J.-J. (2009). From facial emotional recognition abilities to emotional attribution: A study in Down syndrome. *Research in Developmental Disabilities*, 30, 1007–1022. <https://doi.org/10.1016/j.ridd.2009.02.004>
- Jasielska, A. (2013). *Charakterystyka i konsekwencje potocznego rozumienia emocji*. [Characteristics and consequences of the colloquial understanding of emotions] Poznań: Wydawnictwo Naukowe UAM.
- Jasielska, A., & Buchnat, M. (2017). Knowledge about the joy in children with mild intellectual disability. *Polish Psychological Bulletin*, 48(2), 154–166. <https://doi.org/10.1515/ppb-2017-0019>

- Karmiloff-Smith, A., Thomas, M. S. C., & Johnson, M. H. (Eds.). (2018). *Thinking Developmentally from Constructivism to Neuroconstructivism: Selected Works of Annette Karmiloff-Smith* (1st ed.). London: Routledge. <https://doi.org/10.4324/9781315516691>
- Kasari, C., Freeman, S. F. N., & Bass, W. (2003). Empathy and response to distress in children with Down syndrome. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 44(3), 424–431. <https://doi.org/10.1111/1469-7610.00132>
- Kowsalya, D. N., Lakshmi, H. V. M., & Suresh, K. P. (2012). Development and validation of a scale to assess self-concept in mild intellectually disabled children. *International Journal of Science Education*, 2(4), 699–709.
- Kövecses, Z. (2020). *Extended Conceptual Metaphor Theory*. Cambridge: Cambridge University Press.
- Lazarus, R. (1994). Universal antecedents of the emotions. In: P. Ekman & R. J. Davidson (Eds.), *The nature of emotions: Fundamental questions* (pp. 163–171). Oxford: Oxford University Press.
- Leahy, R. L. (2015). *Emotional schema therapy*. New York: Guilford Press.
- Lave, J., & Gomes, A. (2019). The Problem of Context and Practices of Decontextualization. In: *Learning and Everyday Life: Access, Participation, and Changing Practice* (pp. 27-50). Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108616416.003>
- Lindsay, W. R., Taylor, J. L., & Sturmey, P. (Eds.). (2004). *Offenders with developmental disabilities*. New York: Wiley.
- Maruszewski, T., & Ściagała, E. (1998). *Emocje- aleksytymia-poznanie [Emotions- alexithymia- cognition]*. Poznań: Humaniora.
- McClure, K. S., Halpern, J., Wolper, P. A., & Donahue, J. J. (2009). Emotion regulation and emotion regulation and intellectual disability. *Journal on Developmental Disabilities*, 15(2), 39–44.
- McWilliams, J., de Terte, I., Leathern, J., & Malcom, S. (2014). An evaluation of an emotion programme for people with intellectual disability. *Therapeutic Communities: The International Journal for Therapeutic and Supportive Organizations, Communities*, 35(3), 105–118. <https://doi.org/10.1108/TC-02-2014-0003>
- Moore, D. G. (2001). Reassessing emotion recognition performance in people with mental retardation: A review. *American Journal on Mental Retardation*, 106, 481–502.
- More Channell, M. M., Conners, F. A. & Barth, J. M. (2014). Knowledge in Children and Adolescents With Down Syndrome: A New Methodological Approach. *American Journal on Intellectual and Developmental Disabilities*, 119(5), 405–421. doi: 10.1352/1944-7558-119.5.405. [https://doi.org/10.1352/0895-8017\(2001\)106<0481:RERPIP>2.0.CO;2](https://doi.org/10.1352/0895-8017(2001)106<0481:RERPIP>2.0.CO;2)
- Oatley, K. (2004). *Emotions: A brief history*. Hoboken: Blackwell.
- Obuchowski K. (1982). *Orientierung und Emotion [Orientation and emotion]*. Koln: Pah Rugenstein Verlag.
- Odgen, C. K., & Richards, I. A., (1989). *The meaning of meaning*. Orlando: Mariner Books.
- Ohnuki-Tierney, E. (1981). Phases in human perception/conception/symbolization processes: Cognitive anthropology and symbolic classification. *American Ethnologist*, 8, 451–467. <https://doi.org/10.1525/ae.1981.8.3.02a00030>
- Pavias, M., van den Broek, P., Hickendorff, M., Beker, K. & Van Leijenhorst, L. (2016). Effects of Social-Cognitive Processing Demands and Structural Importance on Narrative Recall: Differences Between Children, Adolescents, and Adults. *Discourse Processes*, 53(5-6), 488-512. <https://doi.org/10.1080/0163853X.2016.1171070>
- Pearson, A., Austin, K., Rose, N., & Rose, J. (2019). Experiences of dialectical behaviour therapy in a community setting for individuals with intellectual disabilities. *International Journal of Developmental Disabilities*, 1–13. <https://doi.org/10.1080/20473869.2019.1651143>
- Porter, M. A., Coltheart, M., & Langdon, R. (2007). The neuropsychological basis of hypersociability in Williams and Down syndrome. *Neuropsychologia*, 45, 2839–2849. <https://doi.org/10.1016/j.neuropsychologia.2007.05.006>
- Rhodes, M., & Baron, A. (2019). The Development of Social Categorization. *Annual review of developmental psychology*, 1, 359–386. <https://doi.org/10.1146/annurev-devpsych-121318-084824>
- Rosch, E. H. (1978). Principles of categorization. In: E. H. Rosch & B. B. Lloyd (Eds.), *Cognition and categorization* (pp. 27–48). Hillsdale: Lawrence Erlbaum.
- Rosset, D. B., Rondan, C., Da Fonseca, D., Santos, A., Assouline, B., & Deruelle, C. (2008). Typical emotion processing for cartoon but not real faces in children with autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, 38(5), 919–925. <https://doi.org/10.1007/s10803-007-0465-2>
- Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: a mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of personality and social psychology*, 76(4), 574–586. <https://doi.org/10.1037//0022-3514.76.4.574>
- Saarni, C. (1999). *The development of emotional competence*. New York: Guilford Press.
- Simeonsson, R. J., & Bailey, D. R. (1988). Assessing needs of family with handicapped infants. *Journal of Special Education*, 22,

117–127.

- Stallard, P. (2019). *Think good feel good: A Cognitive Behavioural Therapy workbook for children and Young People*. 2nd Edition. Hoboken: Wiley Europe.
- Stein, N. L., & Levine, L. J. (1989). The causal organisation of emotional knowledge: A developmental study. *Cognition and Emotion*, 394, 343–378. <https://doi.org/10.1080/02699938908412712>
- Stewart, C. A., & Singh, N. N. (1995). Enhancing the recognition and production of facial expressions of emotion. *Research in Developmental Disabilities*, 16, 365–382. [https://doi.org/10.1016/0891-4222\(95\)00024-H](https://doi.org/10.1016/0891-4222(95)00024-H)
- Stępień-Nycz, M. (2015). *Rozwój reprezentacji emocji w dzieciństwie [The development representation of emotions in childhood]*. Warszawa: Liberi Libri.
- Thirion-Marissiaux, A., & Nader-Grosbois, N. (2008). Theory of Mind 'emotion', developmental characteristics and social understanding in children and adolescents with intellectual disabilities. *Research in Developmental Disabilities*, 29, 414–430. <https://doi.org/10.1016/j.ridd.2007.07.001>
- Torralva, T., Roca, M., Gleichgerrcht, E., López, P., & Manes, F. (2009). INECO Frontal Screening (IFS): A brief, sensitive, and specific tool to assess executive functions in dementia. *Journal of the International Neuropsychological Society*, 15(5), 777–786. <https://doi.org/10.1017/S1355617709990415>
- Vygotsky, L. (1986). *Thought and language*. Cambridge: The MIT Press.
- Wishart, J. G., Cebula, K. R., Willis, D. S., & Pitcairn T. K. (2007). Understanding of facial expressions of emotion by children with intellectual disabilities of differing aetiology. *Journal of Intellectual Disabilities*, 51, 551–563. <https://doi.org/10.1111/j.1365-2788.2006.00947.x>