Chapter

# Do Children Learn Representations, Stigmas, and Stereotypes About Disability, or Do They Create Them to Some Extent?

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**Abstract**

Attitudes towards disability result from the tendency of human beings to create representations from experience. Models of disability are categorical representations that organize experience and help people to identify and explain the social reaction to human, biological, and social diversity, which can be the result of both cultural learning processes and the outcome of evolved psychological mechanisms. This chapter reports two research studies conducted by Federici and colleagues which were designed to verify whether the wide range of attitudes toward people with disabilities and disability models are attributable not only to contextual variables but also to universal psychological mechanisms. These studies were carried out to shed light on the following research questions: (i) What understanding of the causal origin of disability do young children have? (ii) Does parental education create and shape the disability representations of their children? (iii) Is the Piagetian assumption that young children conceptualize disability with difficulty evidence-based? In the first mixed-method research study, four questionnaires were administered to a sample of 76 primary school aged children, and one of their parents (n = 152). Questionnaires included both open-ended and closed-ended questions. The open-ended questions were created to collect uncensored personal explanations of disability, whereas the closed questions were designed to elicit a response about agreement to statements built on the three most widespread disability models: medical/individual, social, and biopsychosocial. Quantitative and qualitative analysis showed that people with disabilities are thought of as being sick by the youngest children in the study (6–8 years old). This early disability representation of children is consistent with the medical/individual model of disability and independent of disability explanations and representations by parents. As children grow older (9–11 years old), knowledge regarding disability increases and stereotypical beliefs about disability decrease, as they tend to espouse their parents’ representations. In the second qualitative research study, children’s cognitive and affective components were assessed through the Affect in Play Scale, where they play with two puppets and one of these was placed in a wheelchair toy. Sixty-three children aged 6–10 years participated in the study. The results showed that when children are involved in pretend play in which concepts of disability emerge, these concepts are almost exclusively related to the medical/individual model of disability. These two studies suggest that: (i) the origin of perceptions, stigmas, and stereotypes about disability and diversity could be traced back to evolved psychological mechanisms and not just to cultural models; (ii) there are implications for intervention with children in educational contexts that aim to teach children about disability.

**Keywords**: models of disability, play of children, pretend play, affect in play scale, medical/individual model, social model

## Introduction

### Models of Disability

Attitudes towards disability result from the tendency of human beings to create representations from experience. Models of disability are categorical representations that organize experience and help people to identify and explain the social reaction to human, biological, and social diversity (Meloni, Federici, and Dennis 2015), which can be the result of both cultural learning processes and the outcome of evolved psychological mechanisms. As cognitive organizers, they offer social frames (Goffman 1963) where expected behaviors and social identities are represented, helping people to make decisions and judgments (Federici and Meloni 2009).

To date, the scientific literature has identified three main models of disability: medical/individual, social, and biopsychosocial (WHO, 2001; Bickenbach et al. 1999). The medical/individual model follows a logical pattern of cause-effect relationship in which disability is a direct consequence of disease, trauma, or other health conditions. In this view, disability is an individual problem that affects people, limiting their social participation. In other words, it represents an individual deviation from biomedical norms of structure or function that requires medical care and treatment by health professionals (Pompili et al. 2013; Bickenbach et al. 1999; Boorse 1975, 1977). Because treatment by medical personnel is central to this model, it is also referred to as the medical/individual model of disability (WHO, 2001; Oliver 1981, 1996; Finkelstein 1980) as the focus is on the individual’s disease, not the persons and their social context. The medical/individual model of disability is undoubtedly the best known and most widely used, and, probably, also the one with the strongest explanatory power and the greatest cognitive availability and accessibility (Meloni, Federici, and Bracalenti 2012).

The medical/individual model further explains disability as the result of individual responsibility on three possible levels (defined as sub-models): ethical, if the individual is held responsible in an ethical/moral sense for their disability; aesthetic, when the individual is judged by their outward appearance in terms of beauty/ugliness and religious, if the cause of the disability is attributed to external spiritual, vitalistic, and religious forces (God, life, Karma, nature, fate, and any other human characteristics “according to nature”) (Albrecht, Seelman, and Bury 2001; Watson, Roulstone, and Thomas 2012).

Unlike the medical/individual model, the social model paints disability as a cultural construct, and the product of a particular social environment, so its causes must be traced to society (Oliver 1990; Roulstone, Thomas, and Watson 2012). Although a specific personal condition may be present, it is not necessarily considered undesirable or in need of remediation: it is not an individual attribute, but rather a complex set of conditions that require social action rather than simply medical treatment (WHO, 2001), as physical barriers or social attitudes prevent the person from accessing virtual and real spaces and make it difficult for them to participate socially and/or pursue personal choices (Gilson and DePoy 2000; Shakespeare and Watson 1997).

This new perspective means that the problem of disability is no longer investigated only from a medical point of view, but considering the social context in which individuals interact; disability is a social construction: “disablement is nothing to do with the body. It is a consequence of social oppression. [...] Impairment is in fact nothing less than a description of the physical body” (Oliver 1996, p. 35). The importance of the environmental and social-relational aspects means that they are considered the two subtypes of the social model.

Finally, the *ICF: International Classification of Functioning, Disability and Health* has used a biopsychosocial model – also known as an interactive model (Bickenbach 2012) – of human functioning and health since 2001, in an attempt to integrate conflicting medical and social models. To achieve this “synthesis” (WHO, 2001), disability is treated not as a consequence of disease, but as the result of three determinants related to human health: health status, environment, and personal factors. The biopsychosocial model of disability is also understood as an integration of the two opposing models: the medical/individual, and the social model (WHO, 2001). Health and environment are both considered, so that individual functioning is viewed as a dynamic and nonhierarchical interaction of both, directing the gaze not only to the potential and contextually-dependent capabilities of an individual’s functioning, but also to a person’s performance and participation in specific life contexts.

## Children’s Representation of Disability

Models of disability can also frame how children represent and relate to people with disability. Research based on Piagetian stage theory (Piaget 1954, 1952, 1929) claimed that young children’s difficulty in conceptualizing disability was the result of their being too cognitively immature (Glenberg 1997; Lewis 1993, 1995). According to these approaches, children can only process and structure knowledge about disability across a range of explanations for disabilities identifiable among the three main models of disability, which include the physical, biological, and psychological causes of disablement and health, when they reach approximately 11 years of age. Although debate continues, studies of cognition in infancy demonstrate that knowledge begins to emerge early in life, and constitutes part of a human’s innate endowment (Baillargeon, Spelke, and Wasserman 1985; Spelke 1994; Baillargeon, Kotovsky, and Needham 1995), including an early understanding of disease causality (Sigelman et al. 1993; Springer and Ruckel 1992). In line with this work, challenging Piagetian framed research on children’s knowledge of illness causation, Smith and Williams (2004) explored children’s understanding of the origins of disabilities. They found that 4- to 11-year-old children showed a preference for physical and biological causes of disability (consistent with an medical/individual model) and rejected social–psychological causal explanations (consistent with a social model). In line with Smith and Williams (2004), Federici and colleagues (Federici et al. 2017; Meloni, Federici, and Dennis 2015; Meloni, Federici, and Bracalenti 2012) also found that 6- to 11-year-old children used the medical/individual model of disability as a cognitive organizer to identify and understand the origins of disability.

The present chapter reports, and supplements with qualitative data that is not yet published elsewhere, the quantitative findings of our two previously published studies (Meloni, Federici, and Dennis 2015; Federici et al. 2017). The studies were designed to verify whether the wide range of attitudes toward people with disabilities, and disability models, are attributable not only to contextual variables, but also to the universal psychological mechanisms observed in the children’s representations about disability.

Study 1 (Meloni, Federici, and Dennis 2015) tested whether beliefs about disability patterns are culturally transmitted. If disability models were exclusively a cultural product, they would only be the result of a learning process. The study therefore analyzed the extent of cultural transmission of the three models of disability (medical/individual, social, and biopsychosocial) by comparing the descriptions and beliefs about disability given by parents and their children. Accordingly, the patterns of disability were considered dependent variables that were potentially influenced by the child’s environment (family values and education).

Study 2 (Federici et al. 2017) aimed to explore the representations of disability, observing them during pretend play. As play is a natural mode of expression for children, and is a fundamental aspect of their lives (Nicolopoulou 1993), it can be considered a window through which to observe children’s cognitive, affective, and social functioning (Stagnitti 2004), which involves children’s symbolic expression of thoughts and feelings (Russ 2004; Cherney et al. 2003).

Two different methodologies were, therefore, adopted to observe the behavior and mental representations of participants. In Study 1, a mixed qualitative–quantitative design was used to investigate the emergence and spread of beliefs regarding disability, adapting the method and tools by Evans (2001, 2000a, 2000b). In the early 2000s, she compared the beliefs of children and parents about the origin of species to evaluate whether the spread of creationist and evolutionist beliefs in the general population was indicative of cognitive constraints or was simply a function of social forces (Evans 2001). Creationism and evolutionism, indeed, have historically and culturally been viewed as contrasting and polarizing. The same is true of disability models, which are contrasting perspectives on human beings and the social world. These models influence the education of children from the time children enter primary school. While the medical/individual model, much like creationism, seems intuitively plausible (Meloni, Federici, and Bracalenti 2012; Federici and Meloni 2009; Federici et al. 2008; Federici and Meloni 2008; Shakespeare 2006; Meloni, Federici, and Dennis 2015), the social model, developed as a reversal of the medical/individual model, is as counterintuitive as evolution (Meloni, Federici, and Dennis 2015; Evans et al. 2012; Lundie 2009; Couser 1997; Dawkins 1987).

In Study 2, the Affect in Play Scale (APS) (Russ 2004, 1993) was adopted when observing children’s behavior; a model of pretend play and scale to measure the play of children aged 6 to 10 years. The APS qualitatively and quantitatively assesses affective and cognitive components of symbolic play using a standardized coding system that allows for the measurement of affective dimensions in fantasy and cognitive dimensions of play. In Study 2, Russ’s (2014, 2004) model and related APS were used to assess the implicit component of the child’s internal representations of disability in the context of symbolic play, in a modified variant that included the introduction of a toy wheelchair.

These studies were carried out to shed light on the following research questions: (i) What understanding of the causal origin of disability do young children have? (ii) Does parental education create and shape the disability representations of their children? (iii) Is the Piagetian assumption that young children conceptualize disability with difficulty evidence-based?

## Study 1

### Method

This is a cross-sectional survey design using mixed methods research collecting and analyzing both qualitative and quantitative data. In this chapter, we report the answers to four open-ended questions administered to children and one of their parents. Data was collected orally for children and in written form for parents. Quantitative data was reported in (Meloni, Federici, and Dennis 2015).

#### Participants

Seventy-six primary school children and one of their parents were involved in Study 1. All children attended state school. The parents provided their written informed consent to participate in this study for themselves and on behalf of the children enrolled in Study 1. A total of 152 participants answered the four open-ended questions.

In order to replicate the procedure of Study 1’s quantitative analysis (Meloni, Federici, and Dennis 2015), the children were divided in two age groups: 6-8 years old (N = 38) and 9-11 years old (N = 38). The parent group was composed of males (N = 22) and females (N = 54) with a mean age of 42.01. All the children also consented personally after the researcher explained that they would be asked what they thought of people who had problems in life.

#### Measurements

##### Open-Ended Questionnaire

The open-ended questionnaire “Explaining disability” was administered to the children and one of their parents in Italian. The questionnaire aims to collect the beliefs and opinions freely expressed by the subjects about the reasons a disabled person may have difficulties in life. The participants were presented with four images in succession: three included a person with a different type of disability (motor, sensory, cognitive) and the fourth included an able-bodied person. Open-ended questions were asked to see how people structure their thoughts when trying to explain why a disabled or able-bodied person has problems in life. For each question a person (fictitious name) is presented and their disability is specified (e.g.: “John is in a wheelchair because he cannot walk”) and this is followed by the question: “Why do you think they has problems in life?” Specifically, the questionnaire consists of the following questions:

1. Giovanni is in a wheelchair because he cannot walk. In your opinion, why does he have difficulties in life?
2. Maria is blind; she cannot see. In your opinion, why does she have difficulties in life?
3. Paolo is autistic and does not always understand what other people say. In your opinion, why does he have difficulties in life?
4. Elena is an able-bodied person. In your opinion, why does she have difficulties in life?

##### Codebook

This was developed according to Federici and colleagues’ paradigm (Meloni, Federici, and Dennis 2015; see also the Supporting Information to the article), in order to verify the model of disability used by the children in the answers. Nine codes were created: (i) ethical model, (ii) aesthetic model, (iii) religious model, (iv) medical/individual model, (v) environmental model, (vi) socio-relational model, (vii) biopsychosocial model, (viii) other, (ix) I don’t know.

1. *Ethical model*: Any expression in which the individual was considered morally or ethically responsible for their disability condition.
2. *Aesthetic model*: Any expression that judged an individual by their appearance, i.e., beauty/ugliness. Judgments related to social class or economic conditions (poverty, marginalization, employment status, social or political class) were not included in this category, and instead fell within the social model.
3. *Religious model*: Any expression which conferred responsibility for the disability to an external spiritual, vital, or religious force: God, life, Karma, nature, fate, and any other human characteristic “according to nature.” This category includes all sorts of popular maxims, aphorisms, sayings, and proverbs, which refer to heteronomous forces and not to the responsibility of an individual or society, as well as beliefs about the naturalness of race, gender, sexual orientation, and skin color.
4. *Medical/individual model*: Any expression that referred the causes of disability to an individual’s state of health. This category also included judgments about any individual dysfunctions. Clear references to ethical judgments in which ethical conduct was responsible and not a health condition, did not fall into this category.
5. *Environmental model*: All expressions that attributed the condition of disability to factors beyond the individual, such as architectural and cultural environments (barriers, rules, regulations, etc.). The passive construction of a phrase or a description of a condition suffered by individuals with a disability was usually a good indication of judgments belonging to this model. External causes classifiable as religious or as related to social attitudes and cultural prejudices that characterize human relationships did not fall into this category.
6. *Socio-relational model*: This model shared all the features of the previous one, but made explicit reference to the attitudes and prejudices that characterize human social relationships. External causes that did not fall into the socio-relational model were classifiable as barriers, rules, and regulations.
7. *Biopsychosocial model*: This was the least common class and difficult to detect. As it referred to a composite model, it involved articulating a complex interaction between the medical, environmental, and socio-relational models with a clear reference to individual functioning (health or disease). It is not to be confused with the simple simultaneous coexistence of medical, environmental, and socio-relational models, as they are not involved in a clear multifactorial interaction, remaining as juxtaposed and independent. Clear exclusion criterion included the presence of any reference to ethical, aesthetic, or religious elements, so any holistic approach that made clear reference to maxims, proverbs, aphorisms, sayings, or beliefs should have been classified under the ethical model and not the biopsychosocial.
8. *Other*: Any complete expression not attributable to one of the previous models or the denial of disability.
9. *I don’t know*: This must have been clearly expressed as a lack of knowledge. It was usually more common in children than in adults. It is not to be confused with the denial of disability that fell within the category “Other.”

According to our classification, the first four categories represent different declinations of the medical/individual model, whereas (*v*) and (*vi*) were related to the social model. Two independent judges assigned the codes to the most significant verbal expressions following a priori established rules reported for each code. The reliability of codes was evaluated by measuring intercoder agreement.

##### Apparatus

The data was digitalized each time a questionnaire was completed. Qualitative processing and coding were undertaken using ATLAS.ti 9 Scientific Software Development GmbH for Windows. Microsoft Excel software was used to enter and process data for statistical analysis, and IBM® SPSS® Statistics 25 for clusterization and creating dendrograms.

#### Procedures

##### Administration Procedure

The participants were presented with four images in succession: three included a person with a different type of disability (motor, sensory, cognitive) and the fourth an able-bodied person. They were asked to answer the “Explaining disability” open-ended questionnaire.

Open-ended questions were used to see how people structured their thoughts when trying to explain why a disabled or able-bodied person has problems in life. For each item the person (fictitious name) is presented specifying the disability that characterizes them (e.g.: “John is in a wheelchair because he cannot walk”) and this is followed by the question: “Why do you think they have problems in life?” All the children answered orally, and these were recorded and later transcribed. The parent (father or mother) read the questions and wrote their answers in the space provided on the questionnaire (Meloni et al., 2015).

##### Coding Procedure

The children’s oral answers were recorded and later transcribed verbatim, and the parents’ written questionnaires were digitalized. ATLAS.ti 9 software was used for qualitative data processing and coding. A top-down coding process was used to develop a codebook expressing models of disability and the codes were applied to children’s and parental answers.

The reliability of the codes was evaluated by measuring intercoder agreement, by assessing the degree of trustworthiness for each code assigned to the same portion of text by two independent researchers for children (CC and GG), and for parents (MC and EAB). The level of agreement between the researchers was assessed using Krippendorff’s alpha for nominal items (McHugh 2012); reliability was considered optimal if α ≥ 0.800, suboptimal with α ≥ 0.667, and non-optimal otherwise.

##### Stemming and Selection of Salient Words Procedure

A stemming procedure was applied to all the salient words belonging to the open-ended answers in order to understand the children’s representation of disability, and which model is most frequently used by them to explain it. Qualitative data were transformed into frequencies using the inverse correlation technique, that is, the frequency of a stem in an answer compared to the frequency of the same stem on all questions.

Only words that were relevant to the questions asked and had semantic relevance for the study were extracted: 1,234 relevant words for the 6-8-year-old children’s group, 1,684 for the 9-11-year-old children’s group and 1,208 for the parents’ group.

By entering all the answers into Atlas.ti 9 we obtained a total of 3,586 words for the 6-8-years-old group, 5,424 words for the 9-11-years-old group, and 5,649 for the parent group. We extracted a “stoplist” from these raw lists: a set of empty words (articles, pronouns, conjunctions, etc.). The 1,234 words (6-8-years-old group), the 1,684 words (9-11-years-old group) and 1,208 words (parents’ group) which were not part of the stoplist were then associated with each other on the basis of the stems of each word (i.e., the part not subject to variation, which contains the fundamental meaning of the word), resulting in a final list of 168 stems for the analysis of the questions and 172 stems for the analysis of the models of disability of children, 378 stems for the analysis of the parents’ answers to the four questions, and 319 stems for the analysis of the models attributed to the answers.

The term frequency-inverse document frequency weight function   
(TF-IDF; Rajaraman and Ullman 2011) was applied to the stem list. TF-IDF measures the relevance of a word in its context of use, which we assumed to be the three main models of disability (medical/individual model, social model and biopsychosocial model), and the four open-ended questions in which the term was used in the response of each participant. Each stem was associated with one of the four contexts of use (the participants’ answers to the four questions in which the stem was extracted) to calculate the relative weight of each stem in relation to its frequency within all the answers given to the same question. This weight function assigns importance to terms that appear in a document in relation to other similar documents. The salience of a stem (TF-IDF) was considered higher the more its frequency in a specific context of use was inversely proportional to its frequency within the total number of stems. The median was used as a non-parametric approach to define a cut-off. Stems from the median value of the TF-IDF scores of each stem group were selected for each of the four questions, and for each of the models (medical/individual model and social model). Next, the stems were hierarchically clustered based on Euclidean distances to the TF-IDF scores of the terms. Stems are thus grouped based on their impact within the disability dimension represented by the question and the corresponding model. The process for selecting the stems upon which the clustering procedure was applied was as follows:

1. For each group, all stems with TF-IDF equal to 0 were eliminated.
2. The median of the TF-IDF scores was calculated for each remaining group of stems.
3. Words were selected from the median value.
4. For each group, the stems of words contained in the instructions of the respective question were eliminated, because they were used by participants only to formulate their answers, and were therefore not useful for the purpose of the research.
5. The meaning of the words in the stems was examined, exploring the answers in which they were contained; if they were considered “empty”, they were eliminated.
6. Only the remaining stems were clustered.

The variation of the agglomeration coefficient was taken into account in the selection of the final number of clusters. It represents the degree of inhomogeneity within the cluster each time a new element is merged: the higher the coefficient, the more dissimilar the grouped elements are, and so the inhomogeneity increases. The solution preceding the maximum variation of the agglomeration coefficient was therefore chosen as the best explanation for the final number of clusters.

#### Data Analysis

Two analyses were conducted, in which both qualitative and quantitative techniques were used. The first analysis was conducted using a top-down coding process, in which categories (models of disability) were attributed to the answers. Frequencies were used as descriptive statistics to calculate the occurrences for each model of disability. The intercoder agreement between coders was also calculated.

In the second analysis, TF-IDF was calculated to detect salient stems, and the median was used as a descriptive non-parametric approach to defining a cut-off, in order to select stems for the cluster analysis. Stems were hierarchically clustered based on Euclidean distances to the TF-IDF scores of the terms. The stems are thus grouped based on their impact within the disability dimension represented by the question and the corresponding model. The grounded-theory technique (Muhr 1991; Glaser and Strauss 2017), an extraction of concepts based on a bottom-up process, was applied to clusters to verify that they corresponded to models of disability revealed from the first analysis coding procedure.

### Results

#### Sample Description

The questionnaire was administered to 76 primary school children and to one of their parents (N = 76). A total of 46.1% of the children were male (*n =* 35) and 53.9% female (*n* = 41), with a mean age of 8.68 (*M* male = 8.74;   
*M* female = 8.63; *SD* male and female = 1.51). All children attended state school. In order to replicate the procedure (Meloni, Federici, and Dennis 2015) the children were divided in two age groups: 6-8 years old (*N* = 38) and 9-11 years old (*N* = 38). Out of 76 parents, 28.9% were male (N = 22) and 71.1% female (N = 54) with a mean age of 42.01 (*M* male = 42.82; *SD = 3.2*; *M* female = 41.41; *SD* = 3.48).

#### Top-Down Analysis

##### Parents’ Group

This initial analysis of 304 total statements (a parent’s answers to the four open-ended questions) showed that the most commonly used model of disability was the medical/individual model (N= 147; 44.52%). No statements referring to the aesthetic sub-model were found.

The level of agreement between two independent evaluators (EAB and MC), calculated using Krippendorff’s Cu-α/cu-α for the parents' group, resulted in 0.859. Intercoder agreement values and the occurrences of category attributions are reported in Table 1.

##### Children’s Group

All the answers (N = 301) given to the open-ended questionnaire of the two groups of children were analyzed separately according to age (6-8 years old and 9-11 years old).

**Table 1.** Intercoder agreement between judges (parents’ group)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | EAB | | MC | | Total | | |
| Semantic domain | *f* | % | *f* | % | *M* | *DS* | % |
| Ethical model | 22 | 4.78 | 18 | 4.34 | 20 | 2.83 | 4.56 |
| Aesthetic model | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Medical/individual model | 139 | 41.59 | 155 | 47.46 | 147 | 11.3 | 44.52 |
| Religious model | 39 | 10.65 | 33 | 8.44 | 36 | 4.24 | 9.5 |
| Environmental model | 52 | 14.63 | 43 | 12.66 | 47.5 | 6.36 | 13.64 |
| Socio-relational model | 52 | 12.12 | 47 | 10.81 | 49.5 | 3.54 | 11.46 |
| Biopsychosocial model | 2 | 1.66 | 2 | 1.66 | 2 | 0 | 1.66 |
| Other | 54 | 12.71 | 51 | 12.50 | 52.5 | 2.12 | 12.60 |
| I don’t know | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Krippendorff’s Cu-α/cu-α | 0,859\*\* | | | | | | |

\*\*Optimal agreement.

Level of agreement between the two independent evaluators (EB and MC), as scored using Krippendorff ’s Cu-α/cu-α, for the parents’ group. Reliability is considered optimal if α ≥ 0.800 and suboptimal with α ≥ 0.667. The frequency (f) and percentage (%) of times that each judge used the code are reported. The last column shows the judges’ mean (M) use of the code, standard deviation (DS), and percentage (%).

The most commonly used model of disability for both groups was the medical/individual model, which was coded 120.5 times (61.47%) for the first group, and 133.5 (61.47%) for the second.

No statements were found referring to the aesthetic model in the answers of both groups, and no statements referring to the biopsychosocial model were used by children aged 6-8.

The level of agreement between two independent evaluators (CC and GG), calculated using Krippendorff’s Cu-α/cu-α for the children groups resulted 0.984 for the 6-8 year old group and 0.969 for 9-11 year old group. Intercoder agreement values and occurrences of categories attribution for both groups of children are reported in Table 2.

#### Bottom-Up Analysis

Two bottom-up analyses were conducted: the first on salient stems for each answer to open-ended questionnaire, the second one on the statements classified with each model of disability.

**Table 2.** Intercoder agreement between judges (6-8-year old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 6-8 year old group | | | | | | | 9-11 year old group | | | | | | |
| CC | | GG | | Total | | | CC | | GG | | Total | | |
| Semantic domain | f | % | f | % | M | DS | % | f | % | f | % | M | DS | % |
| Ethical model | 8 | 4.08 | 7 | 3.57 | 7.5 | 0.70 | 3.82 | 9 | 3.98 | 9 | 3.98 | 9 | 0 | 3.98 |
| Aesthetic model | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Medical/  individual model | 120 | 61.22 | 121 | 61.73 | 120.5 | 0.70 | 61.47 | 133 | 58.84 | 134 | 59.29 | 133.5 | 0.70 | 59.07 |
| Religious model | 9 | 4.59 | 9 | 4.59 | 9 | 0 | 4.59 | 12 | 5.30 | 11 | 4.86 | 11.5 | 0.70 | 5.08 |
| Environmental model | 4 | 2.04 | 4 | 2.04 | 4 | 0 | 2.04 | 6 | 2.65 | 6 | 2.65 | 6 | 0 | 2.65 |
| Socio-relational model | 11 | 5.61 | 11 | 5.61 | 11 | 0 | 5.61 | 29 | 12.83 | 29 | 12.83 | 29 | 0 | 12.83 |
| Biopsychological model | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.44 | 1 | 0.44 | 1 | 0 | 0.44 |
| Other | 39 | 19.89 | 39 | 19.89 | 39 | 0 | 19.89 | 33 | 14.60 | 33 | 14.60 | 33 | 0 | 14.60 |
| I don’t know | 5 | 2.55 | 5 | 2.55 | 5 | 0 | 2.55 | 3 | 1.32 | 3 | 1.32 | 3 | 0 | 1.32 |
| Total Krippendorff ’s Cu-α/cu-α | 0,984\*\* | | | | | | | 0,969\*\* | | | | | | |

\*\*Optimal agreement.

Level of agreement between the two independent evaluators (CC and GG), as scored using Krippendorff ’s Cu-α/cu-α for the children’s groups. Reliability is considered optimal if α ≥ 0.800 and suboptimal with α ≥ 0.667. The frequency (f) and percentage (%) of times each judge used the code are reported. The last column shows the judges’ mean (M) use of the code, standard deviation (DS), and percentage (%).

##### Parents’ Group

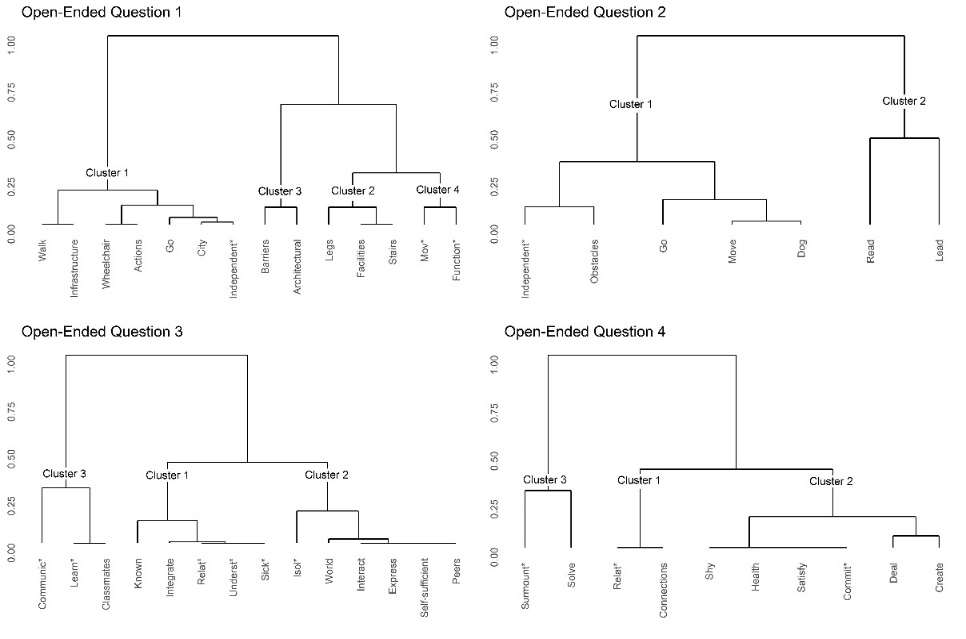
The responses were imported into ATLAS.ti 9, which detected a total word count of 5,649. From this value, 1,208 words for the analysis of the questions and 935 words for the analysis of the models were then grouped according to their stem for ease of analysis. At this point, the TF-IDF weight function was applied using Microsoft Excel, which considered the occurrence of each stem. The TF-IDF median value for each context of use (i. e. question or model of disability) was considered as a cut-off to isolate the salient stems. Only words equal to or above the median were considered significant for the analysis; words with a zero TF-IDF were excluded from the final list. As a result, 45 total salient stems were extracted from the initial 378 stems in the question answers and 32 total salient stems from 319 stems in the models of disability (Table 3).

The first analysis of the salient words in the answers was carried out to verify the models of disability that emerged from the initial coding procedure.

**Table 3. Frequency data about the salient stems (parent’s group)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Open-ended question 1 (N = 14) | | | | | | | | | |
| Barriers | 12 | .00717 | 1.38629 | .00994 | Wheelchair | 3 | .00179 | 1.38629 | .00248 |
| Architectural | 11 | .00657 | 1.38629 | .00911 | Actions | 3 | .00179 | 1.38629 | .00248 |
| Facilities | 8 | .00478 | 1.38629 | .00663 | Go | 11 | .00657 | .28768 | .00189 |
| Stairs | 8 | .00478 | 1.38629 | .00663 | City | 4 | .00239 | .69315 | .00166 |
| Legs | 7 | .00418 | 1.38629 | .0058 | Independent\* | 9 | .00538 | .28768 | .00155 |
| Mov\* | 12 | .00717 | .69315 | .00497 | Walk | 1 | .0006 | 1.38629 | .00083 |
| Function\* | 5 | .00299 | 1.38629 | .00414 | Infrastructure | 1 | .0006 | 1.38629 | .00083 |
| Open-ended question 2 (N = 7) | | | | | | | | | |
| Read | 5 | .00368 | 1.38629 | .0051 | Go | 3 | .00221 | .69315 | .00153 |
| Lead | 3 | .00221 | 1.38629 | .00306 | Independent\* | 5 | .00368 | .28768 | .00106 |
| Move | 10 | .00736 | .028768 | .00212 | Obstacles | 3 | .00221 | .28768 | .00064 |
| Dog | 2 | .00147 | 1.38629 | .00204 |  |  |  |  |  |
| Open-ended question 3 (N = 14) | | | | | | | | | |
| Communic\* | 8 | .0058 | .69315 | .00402 | Interact | 2 | .00145 | 1.38629 | .00201 |
| Learn\* | 3 | .00218 | 1.38629 | .00302 | Isol\* | 3 | .00218 | .69315 | .00151 |
| Classmates | 3 | .00218 | 1.38629 | .00302 | Underst\* | 5 | .00363 | .28768 | .00104 |
| World | 10 | .00725 | .28768 | .00209 | Sick\* | 5 | .00363 | .28768 | .00104 |
| Self-sufficient | 2 | .00145 | 1.38629 | .00201 | Relat\* | 5 | .00363 | .28768 | .00104 |
| Peers | 2 | .00145 | 1.38629 | .00201 | Integrate | 2 | .00145 | .69315 | .00101 |
| Express | 2 | .00145 | 1.38629 | .00201 | Known | 3 | .00218 | .28768 | .00063 |
| Open-ended question 4 (N = 10) | | | | | | | | | |
| Surmount\* | 4 | .00323 | 1.38629 | .00448 | Shy | 2 | .00162 | 1.38629 | .00224 |
| Solve | 6 | .00485 | .69315 | .00336 | Deal | 8 | .00647 | .28768 | .00186 |
| Satisfy | 2 | .00162 | 1.38629 | .00224 | Create | 7 | .00566 | .28768 | .00163 |
| Commit\* | 2 | .00162 | 1.38629 | .00224 | Relat\* | 3 | .00243 | .28768 | .0007 |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Health | 2 | .00162 | 1.38629 | .00224 | Connections | 3 | .00243 | .28768 | .0007 |
| Medical/individual model (N = 14) | | | | | | | | | |
| Succeed\* | 30 | .0079 | .40547 | .0032 | Mov\* | 11 | .0029 | .40547 | .00117 |
| Deal | 10 | .00263 | 1.09861 | .00289 | Perceiv\* | 4 | .00105 | 1.09861 | .00116 |
| Physical\* | 5 | .00132 | 1.09861 | .00145 | Autonom\* | 10 | .00263 | .40547 | .00107 |
| Fortun\* | 5 | .00132 | 1.09861 | .00145 | Natur\* | 2 | .00053 | 1.09861 | .00058 |
| Limit\* | 5 | .00132 | 1.09861 | .00145 | Surpass | 2 | .00053 | 1.09861 | .00058 |
| Suffer\* | 5 | .00132 | 1.09861 | .00145 | Body | 4 | .00105 | .40547 | .00043 |
| Sick\* | 12 | .00316 | .40547 | .00128 | Unlucky | 1 | .00026 | 1.09861 | .00029 |
| Social model (N = 13) | | | | | | | | | |
| Marginalis\* | 8 | .00485 | 1.09861 | .00533 | Underst\* | 8 | .00485 | .40547 | .00197 |
| Mov\* | 14 | .00849 | .40547 | .00344 | Comprehen\* | 6 | .00364 | .40547 | .00148 |
| Go | 13 | .00784 | .40547 | .0032 | Indifference | 2 | .00121 | 1.09861 | .00133 |
| Help\* | 12 | .00728 | .40547 | .00295 | Selfish | 2 | .00121 | 1.09861 | .00133 |
| Environment\* | 11 | .00667 | .40547 | .0027 | Involved | 2 | .00121 | 1.09861 | .00133 |
| Barriers | 11 | .00667 | .40547 | .0027 | Accept | 5 | .00303 | .40547 | .00123 |
| Architectural | 10 | .00606 | .40547 | .00246 |  |  |  |  |  |
| Biopsychosocial model (N = 5) | | | | | | | | | |
| Buildings | 1 | .01042 | 1.09861 | .01144 | Services | 1 | .01042 | 1.09861 | .01144 |
| Ideas | 1 | .01042 | 1.09861 | .01144 | Will | 1 | .01042 | 1.09861 | .01144 |
| Personality | 1 | .01042 | 1.09861 | .01144 |  |  |  |  |  |

Row frequencies (F), term frequency (TF), inverse document frequency (IDF), and term frequency-inverse document frequency (TF-IDF) of the most relevant stems extracted from answers to the four open-ended questions and models of disability are reported. The asterisk indicates that only the stem word has been listed, i.e., a part of a word that can form the basis of other words with similar meaning through the addition of suffixes.



Cluster dendrograms are based on the Euclidean distances’ matrix of the 45 salient stems for open-ended questions 1, 2, 3, and 4. A hierarchical cluster analysis was performed to group similar terms in relation to their TF-IDF index. Euclidean distances are reported on a modified scale with units from 0 to 1   
(0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Figure 1.** Cluster dendrograms of extracted terms from open-ended questions (parents’ group).

There were fourteen salient stems for the first question, and the cluster analysis reveals the presence of four clusters (Figure 1).

1. Social model (“accessibility”). This encompasses all those terms that refer to difficulty in accessing public facilities and using places due to architectural impediments.

“Because the environment, the infrastructure, is not yet ready and functional for a disabled person in a wheelchair.” (Female, 40 years old)

1. Medical/individual model (“physical diversity creating limitations”). The answers focus on the physical diversity of the subject and how this alters the way they live their daily routine.

“Because his body does not function well and therefore, he will have problems in life.” (Female, 38 years old)

1. Social model (“architectural barriers”). The cluster focuses on architectural barriers, i.e., construction elements that prevent, limit, and make difficult the movement and use of services for people with limited mobility.

“Because cities are full of architectural barriers.” (Male, 43 years old)

1. Medical/individual model (“travel limitation”). The cluster focuses exclusively on the movement-related difficulties faced by the person with mobility problems to their legs.

“An accident happened, and he had problems as a child, so he cannot walk with his own legs.” (Female, 36 years old)

For the second question there were seven salient stems and the cluster analysis reveals the presence of two clusters (Figure 1).

1. Medical/individual model (“limitation of normal activities”). The cluster refers to terms that denote how Maria is limited in performing daily activities due to her vision problems.

“Maria needs the help of either a person or a dog that sees for her so she can carry out her activities without any problems.” (Female, 41 years old)

1. Medical/individual model (“needs support for daily activities”). The cluster is represented by two words that refer to the impaired abilities of the blind person.

“Because they cannot read.” (Female, 38 years old)

For the third question there were 14 salient stems and the cluster analysis reveals the presence of three clusters (Figure 1).

1. Social model (“socialization”). Words belonging to this cluster refer to the domain of socialization difficulties that characterize people with autism spectrum disorder.

“Because he cannot fully integrate with the world around him.” (Female, 39 years old)

1. Social model (“interacting with autism”). The emphasis is put on the difficulties that other people encounter when they try to interact with Paolo.

“Because he will be marginalized by his peers, not everyone will be able to understand, but above all accept, his problems.” (Female, 42 years old)

1. Medical/individual model (“getting in touch with others”). In this group, the emphasis is on the difficulties in interaction and communication that Paolo faces in his relationships with others due to his disorder.

“Because he lives a bit disconnected from others around him, because maybe he can’t fully communicate his emotions to others ... because it’s as if he’s tuned to a frequency that’ s different from ours, and what he wants to tell us seems disturbed and incomprehensible!” (Female, 45 years old)

For the fourth question, there were 10 salient stems and the cluster analysis reveals the presence of three clusters (Figure 1).

1. Social (“interpersonal relationship”). The first group concerns the importance of relating to others equally regardless of the presence or absence of disability, as part of a society based on reciprocity and community living.

“Because she doesn’t feel loved and understood, and cannot relate to others.” (Male, 40 years old)

1. Medical/individual model (“personal effectiveness”). In this cluster, we can see how Elena, being a “normal person,” can rely only on her personal resources to cope or not cope with what life offers her.

“Elena has problems in life because even though she can do everything she wants as ‘normal’ people do, everyone has problems in life, but she has the ability to deal with them.” (Female, 43 years old)

1. Medical/individual model (“to solve”). This cluster refers to what Elena needs to learn to solve problems throughout her life. The statements place a strong emphasis on the importance of stopping to reason, think, and find the best way to solve the adversities that life inevitably places on each of us.

“We all have problems in life. It is up to each of us to learn to solve them or accept them.” (Female, 41 years old)

The second analysis was carried out to study the presence of sub-models in the three main categories of models of disability used by the participants.

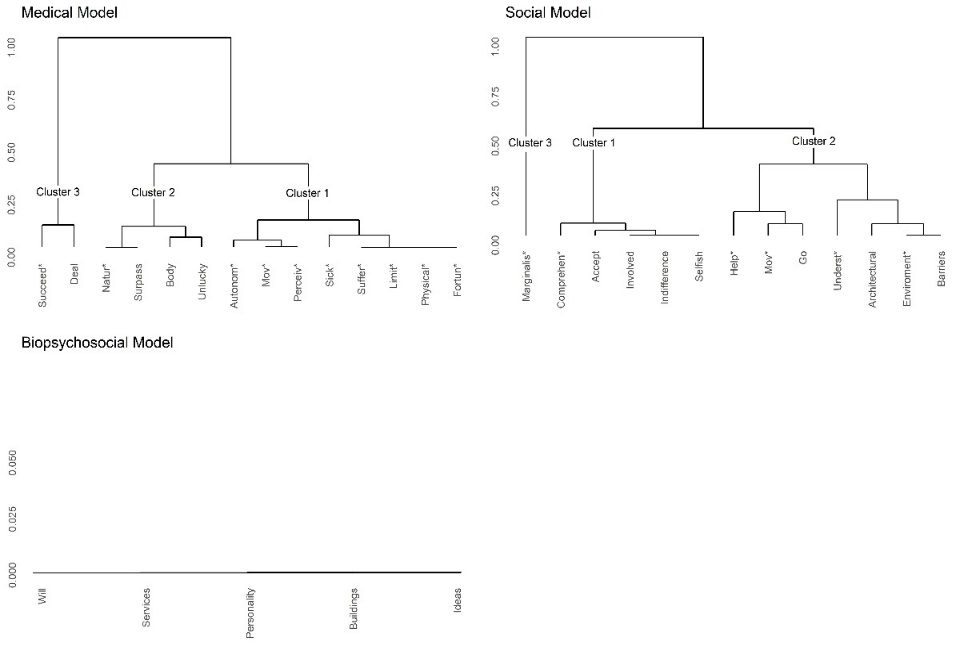
For the medical/individual model there were fourteen salient stems and the cluster analysis revealed the presence of three clusters that refer to all three sub-models (Figure 2):

1. Medical/individual model. It contains terms that refer to physical and non-physical suffering, a disabling condition in an individual’s life. Some words refer to the consequences, particularly the limitations, that disability brings to everyday actions.

“Because he is ill.” (Male, 42 years old)

1. Religious sub-model. Disability does not come from the individual, but from forces beyond a human’s will.

“For by nature human seek what they do not have, and their little daily problems fill their existence.” (Female, 40 years old)



Cluster dendrograms are based on the Euclidean distances’ matrix of the 32 salient stems for the medical/individual model, social model and biopsychosocial model of disability. A hierarchical cluster analysis was performed to group similar terms in relation to their TF-IDF index. Euclidean distances are reported on a modified scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Figure 2**. Cluster dendrograms of extracted terms of models of disability  
(parents’ group).

1. Ethical sub-model. It refers to the importance of personal effectiveness, of succeeding with one’s own strength to solve any problem that life poses.

“Elena will encounter all the problems of normal people and will have to learn to face them and overcome them, always trying to learn from them.” (Female, 39 years old)

For the social model there were thirteen salient stems, and the cluster analysis revealed the presence of three clusters that refer to both its sub-models (Figure 2).

1. Social-relational sub-model. By analyzing the terms, we can see that they refer to the marginalization and social isolation enacted by those around the disabled person.

“For people’s indifference and lack of sensitivity.” (Female, 43 years old)

1. Environmental sub-model. This second cluster is instead characterized by terms that always refer to marginalization and social isolation, but which, unlike the first case, are not due to human attitudes but to infrastructure, the environment, and obstacles that do not allow a disabled person full social participation.

“Architectural barriers often impede normal transit.” (Female, 46 years old)

1. Social model. This last cluster can be considered a synthesis of the previous two (the main model), because it combines the infrastructural and the attitudinal causes of social exclusion.

“Because he is marginalized by society.” (Male, 40 years old)

For the biopsychosocial model there were five salient stems, and the cluster analysis revealed the presence of one cluster that refers to the theoretical definition (Figure 2).

1. Biopsychosocial model. This is a composite and complex model that places individual (biological and psychological) and social factors on the same level as root causes of disability.

“Giovanni will have many problems if society does not create those situations to eliminate architectural and ‘social’ barriers [...]. With the right people near him and a lot of willpower, he could live a ‘normal’ life ... within the limits of his disability.” (Female, 39 years old)

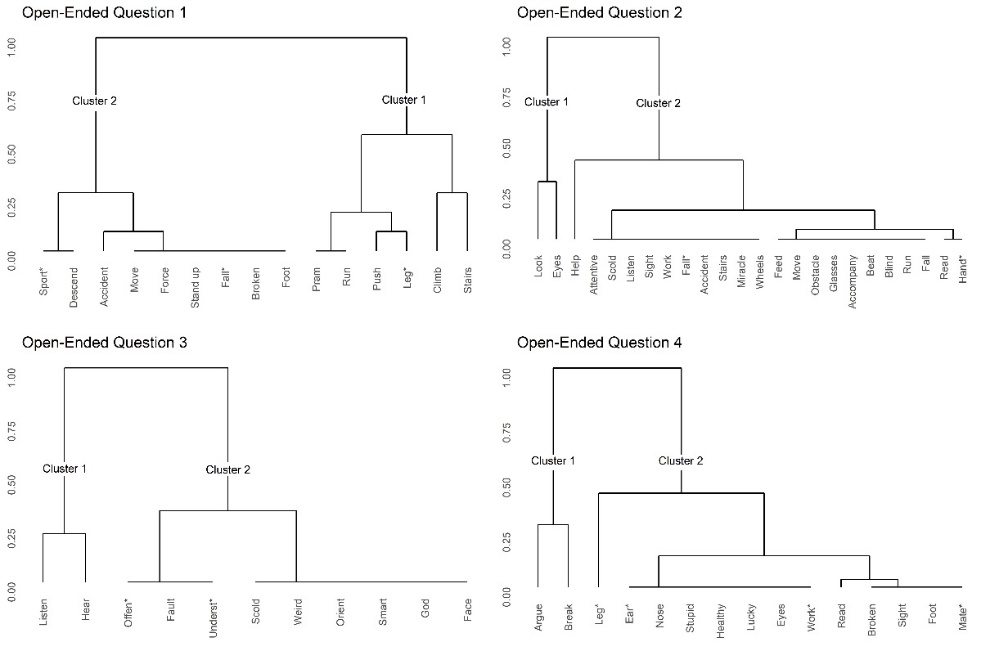
##### Children 6-8 Years Old

For the first analysis, a total of 655 words out of 3586 were considered relevant to the research, and a total of 70 stems were extracted. After applying the TF-IDF, the occurrence of each stem in the four open-ended questions was considered, and those equal to and above the median value of the relevant TF-IDF were considered the most salient stems. From the final list of 70 stems, 65 stems were extracted as displayed in Table 4.

Fifteen salient stems were grouped in two clusters for the first question (Figure 3).

1. Medical/individual model (physical impairment). This first cluster emphasizes the centrality of the body in disability, and what effect the physical impairment has on the individual’s performance.

“He will not be able to run and jump or climb stairs.” (Female, 8 years old)



Cluster dendrograms are based on the Euclidean distances’ matrix of the 65 salient stems for open-ended questions 1, 2, 3, and 4. A hierarchical cluster analysis was performed to group similar terms in relation to their TF-IDF index. Euclidean distances are reported on a modified scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Figure 3.** Cluster dendrograms of extracted terms of open-ended questions   
(6-8 year old children’s group).

**Table 4.** Frequency data about the salient stems (6-8 year old children’s group)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Open-ended question 1 (N = 15) | | | | | | | | | |
| Climb | 7 | .07339 | .60206 | .01933 | Broken | 5 | .01835 | .30103 | .00552 |
| Stairs | 12 | .05046 | .30103 | .01519 | Foot | 5 | .01835 | .30103 | .00552 |
| Push | 5 | .02294 | .60206 | .01381 | Fall\* | 6 | .01835 | .30103 | .00552 |
| Leg\* | 13 | .04128 | .30103 | .01243 | Stand up | 2 | .00917 | .60206 | .00552 |
| Pram | 3 | .01376 | .60206 | .01105 | Force | 2 | .00917 | .60206 | .00552 |
| Sport\* | 3 | .01376 | .60206 | .00829 | Move | 2 | .00917 | .60206 | .00552 |
| Descend | 3 | .01376 | .60206 | .00829 | Accident | 4 | .01376 | .30103 | .00414 |
| Run | 10 | .03670 | .30103 | .01105 |  |  |  |  |  |
| Open-ended question 2 (N = 24) | | | | | | | | | |
| Look | 4 | .02339 | 0,60206 | .01408 | Feed | 1 | .00585 | .60206 | .00352 |
| Eyes | 8 | .03509 | .30103 | .01056 | Read | 8 | .02339 | .12494 | .00292 |
| Help | 12 | .05263 | .12494 | .00658 | Hand\* | 5 | .01754 | .12494 | .00292 |
| Run | 10 | .01170 | .30103 | .00352 | Wheels | 17 | .00585 | .30103 | .00176 |
| Fall | 6 | .01170 | .30103 | .00352 | Stairs | 12 | .00585 | .30103 | .00176 |
| Blind | 7 | .00585 | .60206 | .00352 | Accident | 4 | .00585 | .30103 | .00176 |
| Beat | 1 | .00585 | .60206 | .00352 | Fall\* | 6 | .01170 | .30103 | .00176 |
| Accompany | 1 | .00585 | .60206 | .00352 | Work | 3 | .00585 | .30103 | .00176 |
| Glasses | 1 | .00585 | .60206 | .00352 | Sight | 2 | .00585 | .30103 | .00176 |
| Obstacle | 1 | .00585 | .60206 | .00352 | Listen | 9 | .00585 | .30103 | .00176 |
| Move | 1 | .00585 | .60206 | .00352 | Scold | 3 | .00585 | .30103 | .00176 |
| Miracle | 2 | .00585 | .30103 | .00176 | Attentive | 2 | .00585 | .30103 | .00176 |
| Open-ended question 3 (N = 11) | | | | | | | | | |
| Listen | 9 | .05263 | .30103 | .01584 | Face | 1 | .00658 | .60206 | .00396 |
| Hear | 19 | .10526 | .12494 | .01315 | Smart | 1 | .00658 | .60206 | .00396 |
| Fault | 2 | .01316 | .60206 | .00792 | Orient | 1 | .00658 | .60206 | .00396 |
| Underst\* | 2 | .01316 | .60206 | .00792 | Weird | 1 | .00658 | .60206 | .00396 |

**Table 4.** (Continued)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Offen\* | 2 | .01316 | .60206 | .00792 | Scold | 3 | .01316 | .30103 | .00396 |
| God | 3 | .01316 | .30103 | .00396 |  |  |  |  |  |
| Open-ended question 4 (N = 15) | | | | | | | | | |
| Argue | 4 | .03509 | .60206 | .02112 | Stupid | 1 | .00877 | .60206 | .00528 |
| Break | 3 | .02632 | .60206 | .01584 | Nose | 1 | .00877 | .60206 | .00528 |
| Leg\* | 13 | .03509 | .30103 | .01056 | Ear\* | 1 | .00877 | .60206 | .00528 |
| Eyes | 8 | .01754 | .30103 | .00528 | Read | 8 | .02632 | .12494 | .00329 |
| Work\* | 3 | .01754 | .30103 | .00528 | Mate\* | 2 | .00877 | .30103 | .00264 |
| Lucky | 1 | .00877 | .60206 | .00528 | Sight | 2 | .00877 | .30103 | .00264 |
| Healthy | 1 | .00877 | .60206 | .00528 | Broken | 5 | .00877 | .30103 | .00264 |
| Foot | 5 | .00877 | .30103 | .00264 |  |  |  |  |  |
| Medical/individual model (N = 37) | | | | | | | | | |
| See | 53 | .09725 | .47712 | .04640 | Read | 6 | .01101 | .47712 | .00525 |
| Do | 80 | .14679 | .17609 | .02585 | Broken | 6 | .01101 | .47712 | .00525 |
| Succeed | 25 | .04587 | .47712 | .02189 | Wheel | 15 | .02752 | .17609 | 0,00485 |
| Beat | 17 | .03119 | .47712 | .01488 | Cure | 5 | .00917 | .47712 | .00438 |
| Leg\* | 15 | .02752 | .47712 | .01313 | Hand\* | 5 | .00917 | .47712 | .00438 |
| Underst\* | 38 | .06972 | .17609 | .01228 | Foot | 5 | .00917 | .47712 | .00438 |
| Help | 11 | .02018 | .47712 | .00963 | Push | 5 | .00917 | .47712 | .00438 |
| Problem\* | 28 | .05138 | .17609 | .00905 | Play | 13 | .02385 | .17609 | .00420 |
| Run | 10 | .01835 | .47712 | .00875 | Alone | 11 | .02018 | .17609 | .00355 |
| Sick | 10 | .01835 | .47712 | .00875 | Accident | 4 | .00734 | .47712 | .00350 |
| Stairs | 10 | .01835 | .47712 | .00875 | Homework | 4 | .00734 | .47712 | .00350 |
| Walk | 27 | .04954 | .17609 | .00872 | Look | 4 | .00734 | .47712 | .00350 |
| Listen | 9 | .01651 | .47712 | .00788 | School | 10 | .01835 | .17609 | .00323 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Write | 9 | .01651 | .47712 | .00788 | Difficulty\* | 3 | .00550 | .47712 | .00263 |
| Blind | 7 | .01284 | .47712 | .00613 | God | 3 | .00550 | .47712 | .00263 |
| Born | 7 | .01284 | .47712 | .00613 | Break | 3 | .00550 | .47712 | .00263 |
| Hear | 17 | .03119 | .17609 | .00549 | Arm | 3 | .00550 | .47712 | .00263 |
| Fall\* | 6 | .01101 | .47712 | .00525 | Descend | 3 | .00550 | .47712 | .00263 |
| Sport | 3 | .00550 | .47712 | .00263 |  |  |  |  |  |
| Social model (N = 13) | | | | | | | | | |
| Offen\* | 2 | .02807 | .47712 | .02806 | Punch | 1 | .01403 | .47712 | .01403 |
| Do | 4 | .02072 | .17609 | .02071 | Suffer | 1 | .01403 | .47712 | .01403 |
| Friend\* | 4 | .02072 | .17609 | .02071 | Mates | 1 | .01403 | .47712 | .01403 |
| Problem\* | 3 | .01554 | .17609 | .01553 | Behave | 1 | .01403 | .47712 | .01403 |
| Blind | 1 | .01403 | .47712 | .01403 | Weird | 1 | .01403 | .47712 | .01403 |
| Fault | 1 | .01403 | .47712 | .01403 | School | 2 | .01036 | .17609 | .01403 |
| Climb | 1 | .01036 | .17609 | .01035 |  |  |  |  |  |

Row frequencies (F), term frequency (TF), inverse document frequency (IDF), and term frequency-inverse document frequency (TF-IDF) of the most relevant stems extracted from answers to the four open-ended questions and models of disability are reported. The asterisk indicates that only the stem word has been listed, i.e., a part of a word that can form the basis of other words with similar meaning through the addition of suffixes.

1. Medical/individual model (lack of autonomy). This highlights the inability of the subject to perform specific actions without the presence of someone to help them.

“Because he is in a wheelchair. A child who cannot walk can have a lot of illnesses and difficulties, when he wakes up in the morning someone has to help him.” (Male, 8 years old)

For the second question 24 salient stems were grouped in two clusters (Figure 3).

1. Medical/individual model (physical impairment). The first cluster was associated with the medical/individual model because it emphasizes a blind person’s difficulty seeing.

“She cannot see from the eyes.” (Female, 7 years old)

1. Medical/individual model (activity limitation). This cluster highlights the restricted range of activities that a blind person can carry out.

“She cannot watch television, she cannot read, she cannot write, she cannot work on the computer, she cannot go shopping. She could fall, hit a wall. She could not go to school because she cannot see, because she cannot write and because she cannot read.” (Male, 8 years old)

Eleven stems were grouped in two clusters for the third question  
(Figure 3).

1. Medical/individual model (physical impairment). This cluster shows how Paul’s difficulty in understanding other people is explained by children as due to an auditory sensory deficit.

“He cannot understand what others say because he cannot hear and cannot do what someone says [...]. Because he cannot understand anything.” (Female, 7 years old)

1. Medical/individual model (attribution of responsibility). The cluster refers to an explanation of Paolo’s disability as a result of inappropriate behavior. Paolo’s behavior was not seen in relation to autism but in relation to his conduct.

“In my opinion he does not listen to his parents and can be scolded for this. At school he doesn’t listen to the teacher and therefore he can be scolded and get bad marks; with his friends he wouldn’t have a good relationship, at least I would prefer to be with other friends because he is a weird person.” (Female, 8 years old)

For the fourth question, 15 salient stems were grouped in two clusters (Figure 3).

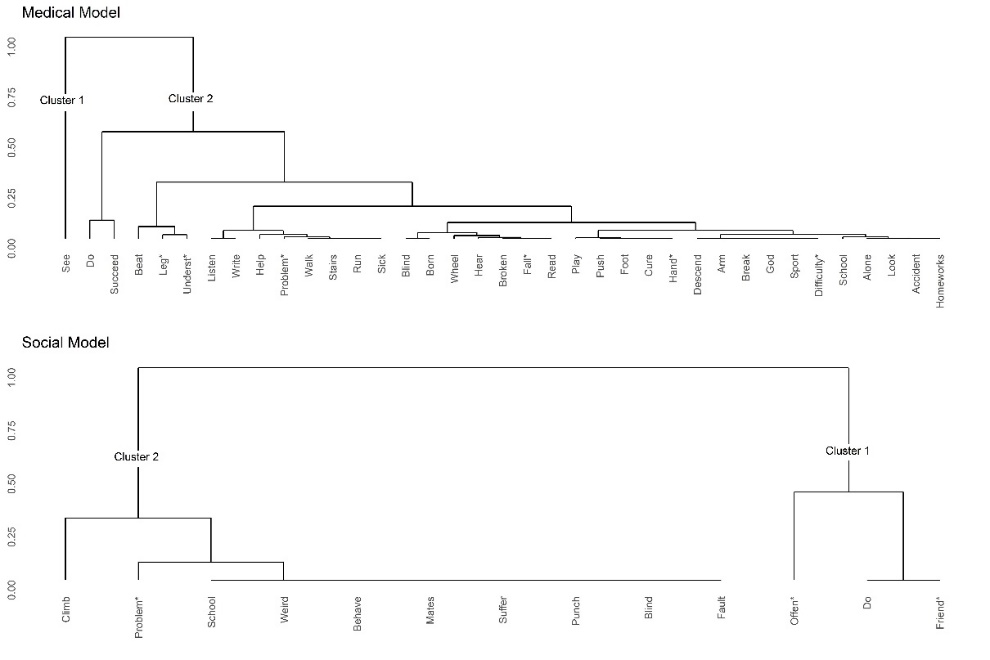
1. Medical/individual model (accidental situations). It highlights the potential that a person without disabilities has of encountering problems sometimes described as individual responsibility.

“If he trips, he breaks a leg or an arm or crashes into a car or bike” (Male, 7 years old)

1. Medical/individual model (transitory difficulties). It describes temporary difficulties which are considered resolvable compared to the difficulties of the other three people, including physical difficulties or the absence of illness.

“Because she is not like the others, she can eat, she can walk, she can walk alone, she can see people greeting her [...] she is fine, she is normal.” (Female, 7 years old)

The second analysis was carried out to study the presence of sub-models in the three main categories of models of disability used by participants. A total of 579 words out of 3586 were considered relevant to the research, and a total of 79 stems were extracted. Those equal to and above the median value of the relevant TF-IDF for each model were considered the most salient stems, and a total of 50 stems were extracted as displayed in Table 4. No salient words were found for the biopsychosocial model because the number of answers coded was not considered sufficient.



Cluster dendrograms are based on the Euclidean distances’ matrix of the 50 salient stems for the medical/individual model and social model of disability. A hierarchical cluster analysis was performed to group similar terms in relation to their TF-IDF index. Euclidean distances are reported on a modified scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/  
dissimilarity).

**Figure 4.** Cluster dendrograms of extracted terms of models of disability  
(6-8 year old children’s group).

For the medical/individual model, 41 salient stems were grouped into two clusters (Figure 4).

1. Medical/individual model (sight). The first cluster consists of only one item; it explains very well the importance that children gave to the most important sense.

“If she cannot see, she must always stay at home with someone to help her do everything because she cannot do anything on her own.” (Female, 7 years old)

1. Medical/individual model (body functions and structures). The second cluster shows the disability represented as due to an impairment at the level of body structures (anatomical parts of the body), and to the impossibility of carrying out specific activities of daily life.

“Because she may have broken her spine, broken a leg, an arm or something like that, she may not be able to walk or have some difficulty in writing and standing.” (Male, 8 years old)

References to the ethical submodel and the religious submodel were identified within this cluster, but their presence was not considered significant enough to show a clear difference from the most commonly used submodel (medical/individual model).

Fifteen stems were grouped into two clusters for the social model (Figure 4).

1. Social-relational submodel (difficulties in relationships). The first cluster was related to the social-relational submodel because it highlights how a person with disabilities may be excluded by peers in some situations.

“[...] nobody wants him [...] he cannot make friends and he suffers from loneliness.” (Male, 8 years old)

1. Environmental submodel (restriction to social participation). This explains how prejudices and architectural barriers can reduce a person’s social participation. Even in this case some of the references detected refer to difficulties related to school environments.

“I would change the structure of the school so that there are no stairs.” (Female, 8 years old)

##### Children 9-11 Years Old

For the first analysis, a total of 916 words out of 5424 were considered relevant to the research, and a total of 98 stems were extracted. After applying the TF-IDF, the occurrence of each stem in the four open questions was considered, and the most salient stems were considered those equal to and above the median value of the relevant TF-IDF. From the final list of 98 stems, 72 stems were extracted as displayed in Table 5.

**Table 5.** Frequency data about the salient stems (9-11 year old children’s group)

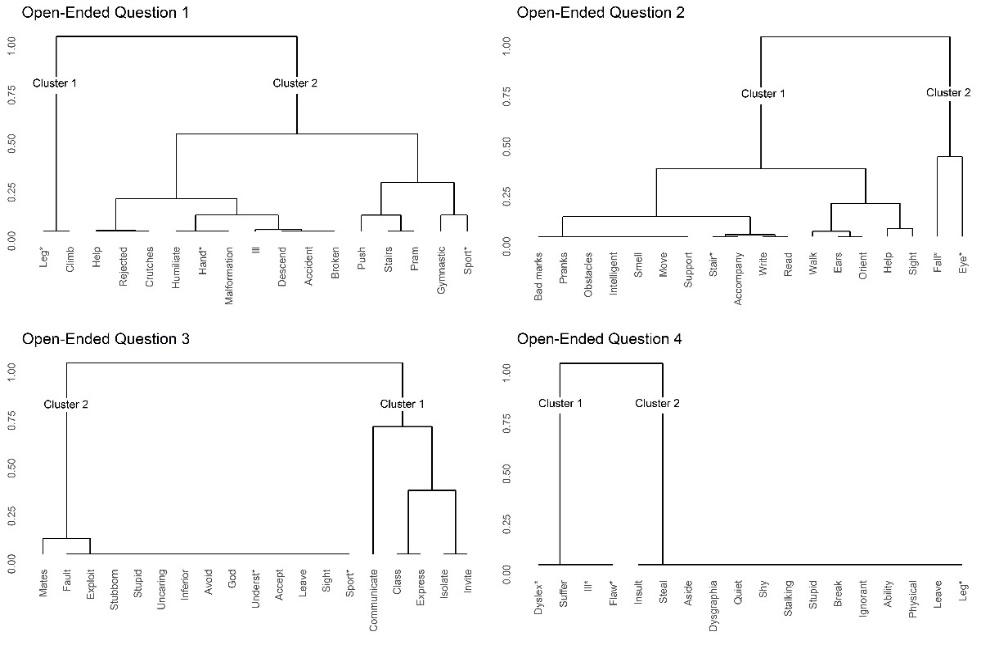
|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Open-ended question 1 (N = 17) | | | | | | | | | |
| Leg\* | 16 | .05426 | .30103 | .01633 | Help | 26 | .03488 | .12494 | .00463 |
| Climb | 7 | .02713 | .60206 | .01633 | Accident | 4 | .01163 | .30103 | .00350 |
| Push | 4 | .01550 | .60206 | .00933 | Broken | 4 | .01163 | .30103 | .00350 |
| Stairs | 10 | .02713 | .30103 | .00817 | Descend | 4 | .01163 | .30103 | .00350 |
| Pram | 8 | .02713 | .30103 | .00817 | Ill | 13 | .02713 | .12494 | .00339 |
| Gymnastic | 3 | .01163 | .60206 | .00700 | Hand\* | 3 | .00775 | .30103 | .00233 |
| Sport\* | 7 | .01938 | .30103 | .00583 | Malformation | 1 | .00388 | .60206 | .00233 |
| Rejected | 2 | .00775 | .60206 | .00467 | Humiliate | 1 | .00388 | .60206 | .00233 |
| Crutches | 2 | .00775 | .60206 | .00467 |  |  |  |  |  |
| Open-ended question 2 (N = 18) | | | | | | | | | |
| Fall\* | 6 | .02326 | .60206 | .01400 | Move | 3 | .00775 | .30103 | .00233 |
| Eye\* | 4 | .01550 | .60206 | .00933 | Support | 1 | .00388 | .60206 | .00233 |
| Help | 6 | .05039 | .12494 | .00630 | Smell | 1 | .00388 | .60206 | .00233 |
| Sight | 7 | .01938 | .30103 | .00583 | Intelligent | 1 | .00388 | .60206 | .00233 |
| Ears | 2 | .00775 | .60206 | .00467 | Obstacles | 1 | .00388 | .60206 | .00233 |
| Orient | 2 | .00775 | .60206 | .00467 | Pranks | 1 | .00388 | .60206 | .00233 |
| Walk | 43 | .03488 | .12494 | .00436 | Bad marks | 1 | .00388 | .60206 | .00233 |
| Stair\* | 10 | .01163 | .30103 | .00350 | Write | 11 | .02713 | .12494 | .00339 |
| Accompany | 4 | .01163 | .30103 | .00350 | Read | 9 | .02713 | .12494 | .00339 |
| Open-ended question 3 (N = 19) | | | | | | | | | |
| Communicate | 4 | .01786 | .60206 | .01075 | Underst\* | 1 | .00446 | .60206 | .00269 |
| Class | 3 | .01339 | .60206 | .00806 | God | 1 | .00446 | .60206 | .00269 |
| Express | 3 | .01339 | .60206 | .00806 | Avoid | 1 | .00446 | .60206 | .00269 |
| Isolate | 5 | .01786 | .30103 | .00538 | Inferior | 1 | .00446 | .60206 | .00269 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Invite | 2 | .00893 | .60206 | .00538 | Uncaring | 1 | .00446 | .60206 | .00269 |
| Mates | 10 | .02679 | .12494 | .00335 | Stupid | 1 | .00446 | .60206 | .00269 |
| Sight | 7 | .00893 | .30103 | .00269 | Stubborn | 1 | .00446 | .60206 | .00269 |
| Sport\* | 7 | .00893 | .30103 | .00269 | Exploit | 1 | .00446 | .60206 | .00269 |
| Leave | 4 | .00893 | .30103 | .00269 | Fault | 1 | .00446 | .60206 | .00269 |
| Accept | 1 | .00446 | .60206 | .00269 |  |  |  |  |  |
| Open-ended question 4 (N = 18) | | | | | | | | | |
| Ill\* | 2 | .01361 | .60206 | .00819 | Break | 1 | .00680 | .60206 | .00410 |
| Flaw\* | 2 | .01361 | .60206 | .00819 | Stupid | 1 | .00680 | .60206 | .00410 |
| Suffer | 2 | .01361 | .60206 | .00819 | Stalking | 1 | .00680 | .60206 | .00410 |
| Dyslex\* | 2 | .01361 | .60206 | .00819 | Shy | 1 | .00680 | .60206 | .00410 |
| Leave | 4 | .01361 | .30103 | .00410 | Quiet | 1 | .00680 | .60206 | .00410 |
| Leg\* | 16 | .01361 | .30103 | .00410 | Dysgraphia | 1 | .00680 | .60206 | .00410 |
| Physical | 3 | .01361 | .30103 | .00410 | Aside | 1 | .00680 | .60206 | .00410 |
| Ability | 1 | .00680 | .60206 | .00410 | Steal | 1 | .00680 | .60206 | .00410 |
| Ignorant | 1 | .00680 | .60206 | .00410 | Insult | 1 | .00680 | .60206 | .00410 |
| Medical/individual model (N = 38) | | | | | | | | | |
| Walk | 42 | .06176 | .47712 | .02947 | Fall | 5 | .00735 | .47712 | .00351 |
| See | 64 | .09412 | .17609 | .01657 | Isolate | 5 | .00735 | .47712 | .00351 |
| Underst\* | 49 | .07206 | .17609 | .01269 | Break | 5 | .00735 | .47712 | .00351 |
| Hear | 18 | .02647 | .47712 | .01263 | School | 11 | .01618 | .17609 | .00285 |
| Leg\* | 13 | .01912 | .47712 | .00912 | Born | 4 | .00588 | .47712 | .00281 |
| Problem\* | 35 | .05147 | .17609 | .00906 | Eye\* | 4 | .00588 | .47712 | .00281 |
| Ill | 12 | .01765 | .47712 | .008450 | Suffer | 4 | .00588 | .47712 | .00281 |
| Stair\* | 10 | .01471 | .47712 | .00702 | Amuse\* | 4 | .00588 | .47712 | .00281 |
| Write | 10 | .01471 | .47712 | .00702 | Foot | 4 | .00588 | .47712 | .00281 |
| Succeed | 26 | .03824 | .17609 | .00673 | Push | 4 | .00588 | .47712 | .00281 |
| Help | 23 | .03382 | .17609 | .00596 | Blind | 9 | .01324 | .17609 | .00233 |

**Table 5.** (Continued)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stem | F | TF | IDF | TF-IDF | Stem | F | TF | IDF | TF-IDF |
| Pram | 8 | .01176 | .47712 | .00561 | Accident | 3 | .00441 | .47712 | .00210 |
| Play | 21 | .03088 | .17609 | .00544 | Descend | 3 | .00441 | .47712 | .00210 |
| Stand up | 7 | .01029 | .47712 | .00491 | Accompany | 3 | .00441 | .47712 | .00210 |
| Listen | 7 | .01029 | .47712 | .00491 | Express | 3 | .00441 | .47712 | .00210 |
| Read | 7 | .01029 | .47712 | .00491 | Gymnastic | 3 | .00441 | .47712 | .00210 |
| Sport\* | 7 | .01029 | .47712 | .00491 | Move | 3 | .00441 | .47712 | .00210 |
| Friend\* | 17 | .02500 | .17609 | .00440 | Climb | 6 | .00882 | .47712 | .00421 |
| Bad | 17 | .02500 | .17609 | .00440 | Difficulty | 16 | .02353 | .17609 | .00414 |
| Social model (N = 24) | | | | | | | | | |
| Problem\* | 9 | .10843 | .17609 | .01909 | Insult | 1 | .01205 | .47712 | .00575 |
| Leave | 3 | .03614 | .47712 | .01725 | Uncaring | 1 | .01205 | .47712 | .00575 |
| Exclude\* | 7 | .08434 | .17609 | .01485 | Stupid | 1 | .01205 | .47712 | .00575 |
| Friend\* | 6 | .07229 | .17609 | .01273 | Stalking | 1 | .01205 | .47712 | .00575 |
| Mate\* | 6 | .07229 | .17609 | .01273 | Humiliate | 1 | .01205 | .47712 | .00575 |
| Cheat | 2 | .02410 | .47712 | .01150 | Consider | 1 | .01205 | .47712 | .00575 |
| Underst\* | 4 | .04819 | .17609 | .00849 | Define | 1 | .01205 | .47712 | .00575 |
| Bad | 4 | .04819 | .17609 | .00849 | Aside | 1 | .01205 | .47712 | .00575 |
| Difficulty\* | 4 | .04819 | .17609 | .00849 | Pain | 1 | .01205 | .47712 | .00575 |
| Exploit | 1 | .01205 | .47712 | .00575 | Steal | 1 | .01205 | .47712 | .00575 |
| Avoid | 1 | .01205 | .47712 | .00575 | Bad marks | 1 | .01205 | .47712 | .00575 |
| Ignorant | 1 | .01205 | .47712 | .00575 | Weird | 1 | .01205 | .47712 | .00575 |

Row frequencies (F), term frequency (TF), inverse document frequency (IDF), and term frequency-inverse document frequency (TF-IDF) of the most relevant stems extracted from answers to the four open-ended questions and models of disability are reported. The asterisk indicates that only the stem word has been listed, i.e., a part of a word that can form the basis of other words with similar meaning through the addition of suffixes.



Cluster dendrograms are based on the Euclidean distances’ matrix of the 72 salient stems for open-ended questions 1, 2, 3, and 4. A hierarchical cluster analysis was performed to group similar terms in relation to their TF-IDF index. Euclidean distances are reported on a modified scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Figure 5.** Cluster dendrograms of extracted terms of open-ended questions   
(9-11 year old children’s group).

Seventeen salient stems were grouped into two clusters for the first question (Figure 5).

1. Medical/individual model (physical impairment). The first describes disability as a disease or deformity that leads to a need for support with clear reference to a linear cause-and-effect causality.

“Because he may have a malformation in his legs or feet. There may also be some relatives who were born in this way, and he has taken over the relatives’ illness.” (Male, 11 years old)

1. Medical/individual model (inability to carry out activities). The second consists of expressions indicating a difficulty experienced by someone with a disability in relation to activities of daily living.

“Since he cannot get up and cannot walk, he cannot do anything in life. In my opinion, he cannot do anything among all the things others do.” (Female, 10 years old)

Eighteen salient stems were grouped in two clusters for the second question (Figure 5).

1. Medical/individual model (need for assistance). The first cluster indicates a need for help and support to perform actions related to school and personal autonomy.

“She cannot surf the internet, she cannot read, maybe she can write but she cannot see what she writes. But if someone reads to her, she can study normally.” (Female, 11 years old)

1. Medical/individual model (obstacles in everyday actions). The second cluster consists of stem groups describing a situation in which everyday activities are complicated to perform because of physical or relational obstacles.

“She can fall very easily because she does not see the obstacles in front of her.” (Female, 9 years old)

Nineteen stems were grouped in two clusters for the third question (Figure 5).

1. Medical/individual model (communication). The first cluster highlights how one of Paolo’s biggest problems, as identified by the children, is his difficulty in communicating.

“Because he cannot communicate with his friends, he cannot understand what they are saying to him.” (Male, 11 years old)

1. Social model (relational complexities). The second cluster was related to the social model because it expresses the classmates’ inability to understand the difficulties that Paolo could have.

“He may lose friends because some friends do not understand his problem and they are uncaring, and they leave him alone.” (Male, 11 years old)

Eighteen salient stems were grouped in two clusters for the fourth question (Figure 5).

1. Medical/individual model (presence/absence of illness). The first cluster was related to the medical/individual model because it describes normality as the absence of illness and problems, and therefore the ability to perform any daily action, or as the potential to experience complications related either to health or to other aspects of daily life.

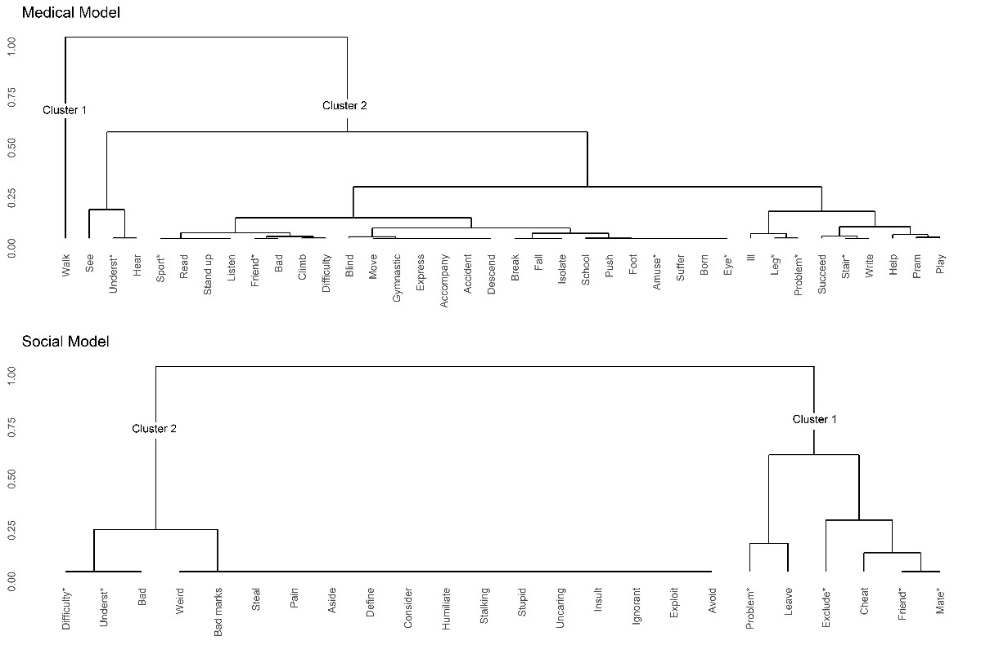
“Any person could fall ill, could end up in a wheelchair because they might break a leg, or could go blind at any moment.” (Male, 9 years old)

1. Medical/individual model (presence/absence of illness). The second cluster was related to the medical/individual model because it indicates that Elena might also have problems related to the body by using hypothetical sentences or a description of “normality” such as the absence of illness.

“She does not have any problems, she can hear, she can see, she can walk.” (Male, 9 years old)

The second analysis was carried out to study the presence of sub-models in the three main categories of models of disability used by participants. A total of 768 words out of 5424 were considered relevant to the research, and a total of 93 stems were extracted. Those equal to and above the median value of the relevant TF-IDF for each model were considered the most salient stems, and a total of 62 stems were extracted as displayed in Table 5.No salient words were found for the biopsychosocial model because the number of the answers coded was not considered sufficient.

For the medical/individual model, 38 salient stems were grouped into two clusters (Figure 6).



Cluster dendrograms are based on the Euclidean distances’ matrix of the 62 salient stems for the medical/individual model and social model of disability. A hierarchical cluster analysis was performed to group similar terms in relation to their TF-IDF index. Euclidean distances are reported on a modified scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Figure 6.** Cluster dendrograms of extracted terms of models of disability  
(9-11 year old children’s group).

1. Medical/individual model (walking). The first cluster was related to the medical/individual model because it describes how the perception of a disability suggests the impossibility of performing specific activities when someone is unable to walk.

“Because he cannot walk. He has to sit all the time. He cannot do gymnastics; he cannot climb stairs.” (Male, 10 years old)

1. Medical/individual model (body functions and structures). The second is formed by stems which explain disability as an impairment at the level of body structures and functions which create a limitation in carrying out normal activities.

“She has problems because she can’t see anyone because she is blind, I think she could just sit on a chair.” (Male, 10 years old)

For the social model 24 stems were grouped into two clusters (Figure 6).

1. Social-relational submodel (social exclusion). The first cluster describes how people with disabilities have difficulties accessing social and educational environments due to peer rejection.

“They can exclude her because maybe they don’t want to stay with a blind person.” (Female, 9 years old)

1. Social-relational submodel (offensive behavior). This describes all those judgmental and rejecting behaviors towards disability.

“He may lose friends, because some friends don’t understand his problem and so they are uncaring and leave him alone.” (Male, 11 years old)

## Study 2

### Method

A cross-sectional survey design using qualitative and quantitative methods was adopted. In this chapter, we report the analysis of data for the natural language (words) of children’s narratives recorded during the pretend play conducted according to the APS method (Russ 2004). The quantitative data were reported in (Federici et al. 2017).

#### Participants

Sixty-three Italian 6- to 10-year-olds were recruited from a public primary school. All were Caucasian, attending mainstream classes, and had no declared disability. Parents provided written, informed consent to their children’s participation in the study, and to the videotaping of their children in the play session. The children also all consented personally after the researcher explained that they would like to watch the child playing with two puppets for a few minutes.

#### Measurements

##### The Standard and Modified Affect in Play Scale

The standard APS (Russ 2004) is a standardized tool for evaluating cognitive and affective dimensions in pretend play in children from 6 to 10 years of age, based on an observational procedure that focuses on different children’s behaviors during a semi-structured, five minute, evidence-based play task. The APS has been used in numerous studies that have demonstrated its good psychometric characteristics. Good inter-rater reliability was achieved, with Cohen’s kappa values ranging from 0.70 to 0.90 (Russ 2004). The APS play task is video recorded, and requires two neutral-looking hand-puppets, representing a boy and a girl, and some little wooden blocks. The instructions are standardized, and facilitate the child playing freely, according to their skills, age, characteristics, and preferences. The researcher introduces the two puppets and the blocks to the child and asks them to play with them for five minutes.

The modified APS was developed for this study in order to observe children’s representations of disability by analyzing the natural language that accompanies their pretend play. It involved changes to the “standard” APS materials and instructions (Russ 2004; Federici et al. 2017). The modified APS play task (Federici et al. 2017) included a wheelchair toy in addition to the two puppets and the blocks. The experimenter introduced the wheelchair toy (wearable by one puppet) and asked the child which of the two puppets (boy or girl) was disabled and which was not. Henceforth, the terms “standard APS” and “modified APS” are used to refer, respectively, to the original instrument (Russ 2004) and to the version developed for this study (Federici et al. 2017).

The APS rating scale (Russ 2004) was used to analyze the standard and the modified APS play tasks. The APS scores used in the present study belong to two domains: affective and cognitive.

Affective domain:

1. The Total Frequency of Affective Expressions score is measured as the sum of eleven affective categories (happiness/pleasure, nurturance/affection, oral, sexual, competition, anxiety/fear, sadness/hurt, frustration/disappointment, aggression, anal, and oral aggression). The categories can be applied to verbal or nonverbal expressions, and can be an affect state (“This is fun”) or an affect theme (“This bomb is going to explode”).
2. Frequency of Positive Affect score: sum of the five affect categories: happiness/pleasure, nurturance/affection, competition, oral, and sexual.
3. Frequency of Negative Affect score: sum of the six affect categories (aggression, sadness/hurt, anxiety/fear, frustration/disappointment, oral aggression, and anal).
4. Variety of Total Affect Categories score: a count of affect expressions across the 11 possible categories.
5. Variety of Positive Affect Categories: a count of affect expressions across the five positive categories.
6. Variety of Negative Affect Categories: a count of affect expressions across the six negative categories.

Cognitive domain, rated on a five-point Likert-type scale:

1. Organization: includes the quality and the complexity of the play plot.
2. Elaboration: measures the amount of embellishment in the play in terms of theme, facial expression, voice tones and character development.
3. Imagination: involves the number of ideas, novelty, and fantasy of the play in terms of the presence of themes outside everyday experience.
4. Comfort: rates the child’s overall level of enjoyment when engaging in pretend play and their ability to be involved in play.

Representation of disability was only scored for the modified APS. Expressions were classified by assigning them to one of three categories of disability model (medical, social, and biopsychosocial), as follows:

1. Medical/individual model: statements in which the disability was related to the health of the disabled puppet. This category also included statements about impairments assigned to the disabled puppet. This category includes: (a) all statements implying that the disabled puppet (i.e., puppet in the wheelchair) was considered morally or ethically responsible for their disability; (b) any judgment based on the appearance of the disabled puppet, e.g., beauty, or ugliness; (c) any statement assigning responsibility for the disability to an external spiritual, vital, or religious force.
2. Social model: all statements that attributed the disability to factors beyond control of the disabled puppet, such as architectural and cultural environmental factors (barriers, rules, regulations, etc.), or to human attitudes and prejudices.
3. Biopsychosocial model: as the biopsychosocial model is a composite, we included articulations attributing disability to a complex interaction of medical, environmental, and socio-relational factors in this category, including a clear reference to individual functioning (health or disease).

#### Procedures

##### Administration Procedure

After a parent had provided written, informed consent for their child’s participation, the researcher explained to the child that they would like to learn about play by watching the child play with the two puppets for a few minutes, and asked for the child’s own consent to this. All children were assessed individually. The semantic discrimination task was first administered to assess comprehension of the concept “disabled.” The children were then invited to play using both the standard APS and the modified APS play task sequentially. The two sessions (standard and modified) were administered consecutively, and were videotaped. The procedure lasted roughly fifteen minutes (5 minute semantic discrimination task; 5 minute standard APS; 5 minute modified APS).

##### Coding Procedures

The modified APS play task verbatim transcriptions were scored by two independent trained coders. The score for each disability model (medical/individual, social, biopsychosocial) is obtained by summing the child’s expressions as attributable to each model. Inter-rater reliability was assessed using the Pearson correlation coefficient on 20 randomly selected protocols. The correlations between the two judges for all the scores ranged from 0.87 to 0.94.

#### Data Analysis

Descriptive statistics (mean, M; standard deviation, SD) were calculated to provide a profile of the sample. Inferential statistics (multivariate ANOVA and univariate ANOVA) were used to compare children’s play performance on the standard APS and modified APS, and *t*-tests for unpaired samples and effect sizes for Student’s *t*-test (Cohen’s *d*) were calculated to compare children’s play performance on the standard APS with normative Italian data. Chi-square tests were used to explore the association between children’s gender and models of disability, and correlational analysis was used to explore the association between children’s age and models of disability. Data were analyzed using IBM® SPSS® Statistics 25.

### Results

#### Sample Description

Fifty-five out of 63 primary school pupils invited to play completed the experiment (male: *n* = 28, 50.9%; female: *n* = 27, 49.1%; *M* age = 8.10 years, *SD* = 1.45, range: 6–10) (Table 6). Eight pupils stopped playing after a two minute period in one or both of the tasks. These pupils were thus excluded from the analyses.

Twenty-five pupils played with the standard APS play task first.

**Table 4.** Sample description (Study 2)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Males | | Females | | Total | |
| Age | *M* | *DS* | *M* | *DS* | *M* | *DS* |
| 6-10 | 8.36 | 1.44 | 7.81 | 1.42 | 8.10 | 1.45 |
| Grade | *n* | *%* | *n* | *%* | *N* | *%* |
| I (aged 6) | 4 | 14.3 | 6 | 22.2 | 11 | 18.2 |
| II (aged 7) | 5 | 17.9 | 7 | 25.9 | 12 | 21.8 |
| III (aged 8) | 5 | 17.9 | 5 | 18.5 | 10 | 18.2 |
| IV (aged 9) | 5 | 17.9 | 4 | 14.8 | 9 | 16.4 |
| V (aged 10) | 9 | 32.1 | 5 | 18.5 | 14 | 25.5 |
| First play task | *n* | *%* | *n* | *%* | *N* | *%* |
| Standard APS | 14 | 56 | 11 | 44 | 25 | 45.45 |
| Modified APS | 14 | 46.7 | 16 | 53.3 | 30 | 54.55 |
| Total | *n* | *%* | *n* | *%* | *N* | *%* |
|  | 28 | 50.91 | 27 | 49.09 | 55 | 100 |

Sample description of age, sex, school grade and sequence administration of APS task is reported.

#### Inferential Statistics

A *t*-test for unpaired samples and effect sizes (Cohen’s *d*) was calculated to compare children’s play performance using the standard APS with data from the Italian normative sample. According to Cohen (1988), effect size values of 0.2, 0.5 and 0.8 are considered small, medium and large.

The children in the present sample showed typical play in the standard APS play session, recording similar scores to the normative sample in all APS scores. The only two exceptions to this trend were the frequency of positive affect (*t* = 2.61, *df* = 1264, *p* < 0.01, *d* = 0.333) and the happiness/pleasure category (*t* = 3.33, *df* = 1264, *p* < 0.01, *d* = 0.452). Both Cohen’s d results were of medium size.

The performance results for the APS standard condition and related Italian normative scores are shown in Table 7.

**Table 5.** Means and standard deviations for the sample (Study 2)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Frequency | | Variability | |
| M | SD | M | SD |
| Total frequency of affective expressions | 14.83 (12.61) | 12.99 (11.79) | 3.38 (3.38) | 2.64 (2.21) |
| Frequency of positive affect | 10.73 (7.63) | 9.98 (8.53) | 1.88 (1.74) | 1.33 (1.28) |
| Frequency of negative affect | 4.11 (4.96) | 4.78 (6.31) | 1.58 (1.64) | 1.67 (1.32) |
| Aggression | 0.55 (1.50) | 1.24 (3.71) | 0.22 | 0.42 |
| Nurturance/affection | 1.35 (1.14) | 2.06 (1.81) | 0.42 | 0.49 |
| Happiness/pleasure | 6.50 (4.12) | 5.36 (5.17) | 0.75 | 0.44 |
| Anxiety/fear | 0.63 (0.76) | 1.16 (1.87) | 0.29 | 0.46 |
| Sadness/hurt | 0.78 (1.05) | 1.62 (2.24) | 0.33 | 0.47 |
| Frustration/disappointment | 1.22 (1.34) | 2.27 (2.09) | 0.39 | 0.49 |
| Competition | 0.36 (0.68) | 1.42 (2.29) | 0.09 | 0.29 |
| Oral | 2.11 (1.45) | 4.53 (3.44) | 0.36 | 0.48 |
| Oral aggression | 0.25 (0.08) | 0.93 (0.47) | 0.09 | 0.29 |
| Anal | 0.51 (0.25) | 1.17 (0.91) | 0.22 | 0.42 |
| Sexual | 0.36 (0.25 | 1.11 (1.13) | 0.13 | 0.34 |
| Organization | 2.42 (2.32) | 1.28 (1.15) | - | - |
| Elaboration | 2.36 (2.21) | 1.27 (1.03) | - | - |
| Imagination | 2.35 (2.21) | 1.04 (1.03) | - | - |
| Comfort | 2.73 (2.96) | 1.31 (1.05) | - | - |

In parenthesis are data from the normative Italian sample (Mazzeschi et al., 2016).

A one-way ANOVA was used to explore the possible effects of the APS condition on affective and cognitive components. The test revealed that, with regard to the frequency of the 11 affect categories, the effects of the APS condition were recorded for one category of positive affect, “nurturance/affection” [*F*(1,110) = 11.98, *p* = 0.01, η² = 0.100], and one category of negative affect, “sadness/hurt” [*F*(1, 110) = 9.82, *p* < 0.01,   
η² = 0.083]. An effect size measured using partial η² of 0.01 is a small effect, 0.06 a medium effect, and 0.14 a large effect. Both affect categories were more frequent in the modified APS condition (nurturance/affection:   
*M* = 3.93, *SD* = 5.13; sadness/hurt: *M* = 2.49, *SD* = 3.71). There was no effect of APS condition on cognitive components (organization, elaboration, imagination and comfort), or on variety of affect.

The children’s use of models of disability was then studied. During the modified APS session, 29 out of 55 pupils expressed concepts relevant to a disability model. Twenty-six of those 29 pupils only represented disability through the medical/individual model, two through the medical and social models, and one through only the social model. None of the pupils used the biopsychosocial model.

Amongst the 29 pupils who referred to disability in the modified APS session, the mean frequency of statements related to the medical/individual model was 2.07 (*SD* = 1.28), and the mean frequency of mentions of the social model was 0.27 (*SD* = 0.92). Chi-square tests indicated that there was no relationship between gender and mentions of a disability model [χ²(1, *N* = 29) = 0.31, *p* = 0.58], and no relationship between gender and the relative frequency of the various disability models [χ²(5, *N* = 29) = 5.11, *p* = 0.40].

There was a correlation between age and mentioning at least one model of disability [*r*(55) = 0.27, *p* < 0.05]. There was no relationship between puppet gender and a child’s assignment of the puppet to the wheelchair in the modified APS.

## General Discussion

As previously reported (Federici et al. 2017; Meloni, Federici, and Dennis 2015; Meloni, Federici, and Bracalenti 2012; Federici and Meloni 2009; Federici et al. 2008), our studies confirm the assumption that the medical/individual model is predominant in explaining disability for all age groups, the social model was second in order of importance, and the biopsychosocial model was the least common.

The responses provided by the children in Study 1 meant it was possible to investigate the disability models most frequently used to represent disability. As predicted, there were differences in the use of these models by age group. Starting with the natural language used in the responses, it was found that the medical/individual model was the most widely used by all age groups, and that as children grow older, they begin to introduce words more in line with a social model of disability. As children get older, they provide a more complex explanation of disability, with a more systemic view, but not to the point of adopting the biopsychosocial model, which was not used by either 6-8 year olds or 9-11 year olds.

The results showed differences in the explanations of disability between the two different age groups of children, however. The group of 6-8 year old children showed a representation of disability that focused mainly on the body, body structures, activity limitations, and lack of autonomy, which is consistent with the medical/individual model.

“She cannot see from the eyes.” (Medical/individual model – Female, 7 years old)

“He cannot understand what others say because he cannot hear and cannot do what someone says [...]. Because he cannot understand anything.” (Medical/individual model – Female, 7 years old)

Explanations focusing on the functioning of the body were also found in the group of 9-11 year olds, although some used expressions more related to the social model, namely introducing environmental barriers and social attitudes.

“She can fall very easily because she does not see the obstacles in front of her.” (Medical/individual model – Female, 9 years old)

“He may lose friends because some friends do not understand his problem and they are uncaring, and they leave him alone.” (Social model – Male, 11 years old)

These findings are also consistent with the results of Study 2. In the modified APS condition, children played with the disabled puppet (i.e., the one sitting in the wheelchair) viewing it primarily as sick or in need of medical care, and the non-disabled puppet (i.e., the puppet not sitting in the wheelchair) as healthy and providing care to the other (disabled) puppet. These findings were reflected in the higher frequency of nurturance/affection and sadness/hurt in the modified APS condition. As a cognitive organizer, a model of disability helps people to identify and understand the causal origins of disability that the medical/individual model explains as the direct consequence of a disease, namely a biological individual condition. Our results are therefore in line with those of Smith and Williams (2004), who found that children aged 4-11 years show a preference for physical and biological causes of disability.

In addition, most of the statements by the group of parents in Study 1 referred to the medical/individual model; the social model was also relevant, and much more frequently used than by the children. The social model includes all those terms that refer to a difficulty in accessing public facilities and using places due to environmental barriers. In many responses, parents pointed out that city infrastructure does not allow people with disabilities to move freely, hindering their autonomy of movement. parents pointed out that environmental barriers also impede equal opportunities for social participation, explaining a person’s disabling condition as not due solely to individual health status.

“Because his body does not function well and therefore, he will have problems in life.” (Medical/individual model – Female, 38 years old)

“Because cities are full of architectural barriers.” (Social model – Male, 43 years old)

“Because he will be marginalized by his peers, not everyone will be able to understand but above all accept his problems.” (Social model – Female, 42 years old)

Where the medical/individual model imposes a vision of disability as a characteristic of the individual, the social model focuses not only on the physical/psychological condition experienced by the person, but also on the social and environmental contexts. Children and their parents clarify aspects of social exclusion, discrimination, and inaccessibility well, by using specific words referring to the social model. With increasing age, disability is described as directing the gaze not only to the potential and contextually-dependent capabilities of an individual’s functioning, but also to a person’s performance and participation in specific life contexts. It is no longer just bodily, sensory, or cognitive individual functioning at the center of the problem, but the person. The origins of disability are therefore explained by referring more to external factors than to the individual health condition. Growing, the social context acquires importance, and it is defined as a place of inclusion or exclusion.

This entry of the environment into representations of disability as children progress through elementary school seems to reflect the pattern of Bronfenbrenner’s ecological theory (1979), which illustrates how the social environment can play a key role in the development of the individual. To the extent that the children growing up and entering the school environment expand their microsystem into a meso- and macrosystem, their natural language is also enriched by providing new interpretive models of reality and cognitive constructs (Bronfenbrenner 2005; Smith and Williams 2004; Federici et al. 2017; Meloni, Federici, and Dennis 2015; Meloni, Federici, and Bracalenti 2012; Federici and Meloni 2009; Federici et al. 2008).

These findings (Study 1) are also consistent with those of Study 2. The 26 pupils out of 55 who did not express concepts referable to a disability model were the youngest. This suggests that the capacity to tell stories in which disability is salient develops with age. At an early age, disability does not seem to attract children’s attention and is not featured in their stories. When disability is mentioned in a story, however, it emerges as the most salient element and drives the narrative. The disability element in children’s stories tends to conform mainly, if not exclusively, to “schemata” (Brewer 1999) from the medical/individual model of disability.

That the youngest children did not express concepts referable to a disability model highlights the suggestion made by Smith and Williams (2004) with regard to open-ended verbal methods: young children may have been so concerned with spontaneously generating a causal explanation that they were unable to verbalize a cause. In fact, when a forced-choice paradigm is adopted, as in Smith and Williams (2004) and Meloni et al. (2015; 2012), young children show some causal knowledge of disabilities.

According the research into children’s understanding of the causal origin of disability by Smith and Williams (2004), our results challenge the Piagetian assumption (Piaget 1929, 1952, 1954) that young children find it difficult to conceptualize disability. Indeed, children were not surprised by the diversity of disability, and demonstrated through their behavior during the play task that they had cognitive schemata to process it, and congruent emotions to respond to it. In the modified APS of Study 2, when a toy wheelchair was introduced, children showed more expressions of empathy or sympathy, and help or support with another character (caring/affection), and more expressions of pain, sadness, or loneliness (sadness/hurt), showing themselves to be very sensitive to the presence of the wheelchair. A child, who has a general attitude of compassion and sadness toward disability, demonstrates knowledge of the emotional value of the wheelchair, which is associated with illness and consequent feelings of caring; this explains the measured variations in the affective components of play, but not in the cognitive components.

The findings of the analysis of the three main models of disability in Study 1 show that an increasing variety of sub-models reflecting the acquisition of a broader and more complex view of disability emerges as a person ages. In fact, the cluster analysis of the medical/individual model analysis revealed groups of stems belonging only to the medical/individual sub-model for children, while for parents the medical/individual, ethical, and religious sub-models emerged. The aesthetic sub-model was not found in either group. The cluster analysis for the social model revealed groups of stems belonging only to the socio-relational sub-model for the children, while both socio-relational and environmental sub-models emerged for the parents.

Finally, the biopsychosocial model of disability, recently theorized in literature (WHO, 2001), was found to be the least known, understood, and applied by people (children and parents) according to both Studies 1 and 2. This model was never codified when analyzing the children’s answers. Instead, there are significantly fewer stems extracted from the parent’s answers than in the other two models (medical/individual and social), and they do not form any complex clusters, unlike in the other two models.

## Conclusion

In this chapter, we have tried to answer three questions about children’s conceptualizations of disability. In answer to the first question asking what understanding of the causal origin of disability young children have, we have observed that at an early age, children already have a disability representation characterized by a vision of a person with disability mainly as sick, and whose differences are strictly connected to health. This early disability representation by children is consistent with the medical/individual model of disability, and independent of parents’ disability explanations and representations. With regard to the second question about how parental education affects the representations of their children about disability and diversity, our findings clearly showed that parents do not appear to be the origin of children’s disability schemata, since children are not completely susceptible to parent’s social representations of disability. Nevertheless, it seems that children can be educated about perspectives on disability, adhering to a model of disability representation congruent with social context and parental perspectives. This is reflected in the way that children tend to the children tend to espouse their parents’ representations as they grow up. Finally, we asked whether the Piagetian assumption that young children have difficulty conceptualizing disability was evidence-based. We found that although the perceptual salience of disability increases as a child increases in age, nevertheless, all children, even the youngest, who have paid attention to a disabling condition, possess an obvious natural language that clearly expresses the disability and elaborates on it, and congruent emotions to respond to it. The words used to describe disability also tended to only describe and explain it in its biological and physical dimensions, neglecting any social and cultural determinants of disability, as used more frequently by their parents. Our results therefore challenge the Piagetian assumption that young children conceptualize disability with difficulty. The results also suggest that disability and diversity are strongly and stereotypically associated with a negative and unpleasant dimension of existence, providing evidence for a cognitive mechanism underpinning the cultural construction of the medical/individual model of disability.

## Supplemental Material

**Table 6.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 1 (parents’ group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Barriers | Architectural | Facilities | Stairs | Legs | Mov\* | Function\* | Wheelchair | Actions | Go | City | Independent\* | Walk | Infrastructure |
| Barriers | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Architectural | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Facilities | .003 | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Stairs | .003 | .002 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Legs | .004 | .003 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |
| Mov\* | .005 | .004 | .002 | .002 | .001 | 0 |  |  |  |  |  |  |  |  |
| Function\* | .006 | .005 | .002 | .002 | .002 | .001 | 0 |  |  |  |  |  |  |  |
| Wheelchair | .007 | .007 | .004 | .004 | .003 | .002 | .002 | 0 |  |  |  |  |  |  |
| Actions | .007 | .007 | .004 | .004 | .003 | .002 | .002 | 0 | 0 |  |  |  |  |  |
| Go | .008 | .007 | .005 | .005 | .004 | .003 | .002 | .001 | .001 | 0 |  |  |  |  |
| City | .008 | .007 | .005 | .005 | .004 | .003 | .002 | .001 | .001 | 0 | 0 |  |  |  |
| Independent\* | .008 | .008 | .005 | .005 | .004 | .003 | .003 | .001 | .001 | 0 | 0 | 0 |  |  |
| Walk | .009 | .008 | .006 | .006 | .005 | .004 | .003 | .002 | .002 | .001 | .001 | .001 | 0 |  |
| Infrastructure | .009 | .008 | .006 | .006 | .005 | .004 | .003 | .002 | .002 | .001 | .001 | .001 | 0 | 0 |

Euclidean distance between the 14 stems with higher tf-idf in the parents’ text corpus of answers to open-ended Question 1 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 7.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 2 (parents’ group)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Read | Lead | Move | Dog | Go | Independent | Obstacles |
| Read | 0 |  |  |  |  |  |  |
| Lead | .002 | 0 |  |  |  |  |  |
| Move | .003 | .001 | 0 |  |  |  |  |
| Dog | .003 | .001 | 0 | 0 |  |  |  |
| Go | .004 | .002 | .001 | .001 | 0 |  |  |
| Independent | .004 | .002 | .001 | .001 | 0 | 0 |  |
| Obstacles | .004 | .002 | .001 | .001 | .001 | 0 | 0 |

Euclidean distance between the 7 stems with higher tf-idf in the parents' text corpus of answers to open-ended Question 2 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 8**. Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 3 (parents’ group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Communic\* | Learn\* | Classmates | World | Self-sufficient | Peers | Express | Interact | Isol\* | Underst\* | Sick\* | Relat\* | Integrate | Known |
| Communic\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Learn\* | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Classmates | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| World | .002 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |
| Self-sufficient | .002 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Peers | .002 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Express | .002 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Interact | .002 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Isol\* | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |
| Underst\* | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |
| Sick\* | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |
| Relat\* | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |
| Integrate | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |  |
| Known | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 14 stems with higher tf-idf in the parents’ text corpus of answers to open-ended Question 3 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 9.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 4 (parents’ group)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sourmont\* | Solve | Satisfy | Commit\* | Health | Shy | Deal | Create | Relat\* | Connections |
| Sourmont\* | 0 |  |  |  |  |  |  |  |  |  |
| Solve | .001 | 0 |  |  |  |  |  |  |  |  |
| Satisfy | .002 | .001 | 0 |  |  |  |  |  |  |  |
| Commit\* | .002 | .001 | 0 | 0 |  |  |  |  |  |  |
| Health | .002 | .001 | 0 | 0 | 0 |  |  |  |  |  |
| Shy | .002 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |
| Deal | .003 | .002 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Create | .003 | .002 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |
| Relat\* | .004 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | 0 |  |
| Connections | .004 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | 0 | 0 |

Euclidean distance between the 10 stems with higher tf-idf in the parents' text corpus of answers to open-ended Question 4 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 10.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Medical Model of Disability (parents’ group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Succed\* | Deal | Physical\* | Fortun\* | Limit\* | Suffer\* | Sick\* | Mov\* | Perceiv\* | Autonom\* | Natur\* | Surpass | Body | Unlucky |
| Succed\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Deal | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Physical\* | .002 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Fortun\* | .002 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Limit\* | .002 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Suffer\* | .002 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Sick\* | .002 | .002 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Mov\* | .002 | .002 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Perceiv\* | .002 | .002 | 0 | 0 | 0 | 0 | 0 | .065 | 0 |  |  |  |  |  |
| Autonom\* | .002 | .002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |
| Natur\* | .003 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |
| Surpass | .003 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |
| Body | .003 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |
| Unlucky | .003 | .003 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |

Euclidean distance between the 14 stems with higher tf-idf in the parents’ text corpus of answers coded with medical model are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 11.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Social Model of Disability (parents’ group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Marginalis\* | Mov\* | Go | Help\* | Enviroment\* | Barriers | Architectural | Underst\* | Comprehen\* | Indifference | Selfish | Involved | Accept |
| Marginalis\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Mov\* | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Go | .002 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Help\* | .002 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Enviroment\* | .003 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Barriers | .003 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Architectural | .003 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Underst\* | .003 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |
| Comprehen\* | .004 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |
| Indifference | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |
| Selfish | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |
| Involved | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |
| Accept | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 13 stems with higher tf-idf in the parents’ text corpus of answers coded with social model are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 12.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Biopsychosocial Model of Disability (parents’ group)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Buildings | Ideas | Personality | Services | Will |
| Buildings | 0 |  |  |  |  |
| Ideas | 0 | 0 |  |  |  |
| Personality | 0 | 0 | 0 |  |  |
| Services | 0 | 0 | 0 | 0 |  |
| Will | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 5 stems with higher tf-idf in the parents’ text corpus of answers coded with biopsychosocial model are reported. Euclidean distances are reported on a scale with units from 0 to 1  
(0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 13.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 1 (6-8-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Climb | Stairs | Push | Leg\* | Pram | Sport\* | Descend | Run | Broken | Foot | Fall\* | Stand up | Force | Move | Accident |
| Climb | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Stairs | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Push | .006 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Leg\* | .007 | .003 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Pram | .008 | .004 | .003 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |
| Sport\* | .011 | .007 | .006 | .004 | .003 | 0 |  |  |  |  |  |  |  |  |  |
| Descend | .011 | .007 | .006 | .004 | .003 | 0 | 0 |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Climb | Stairs | Push | Leg\* | Pram | Sport\* | Descend | Run | Broken | Foot | Fall\* | Stand up | Force | Move | Accident |
| Run | .011 | .007 | .006 | .004 | .003 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Broken | .014 | .010 | .008 | .007 | .006 | .003 | .003 | .003 | 0 |  |  |  |  |  |  |
| Foot | .014 | .010 | .008 | .007 | .006 | .003 | .003 | .003 | 0 | 0 |  |  |  |  |  |
| Fall\* | .014 | .010 | .008 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 |  |  |  |  |
| Stand up | .014 | .010 | .008 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 |  |  |  |
| Force | .014 | .010 | .008 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 |  |  |
| Move | .014 | .010 | .008 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Accident | .015 | .011 | .010 | .008 | .007 | .004 | .004 | .004 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |

Euclidean distance between the 15 stems with higher tf-idf in the 6-8 years old children’s text corpus of answers to open-ended Question 1 are reported. Euclidean distances are reported on a scale with units from 0 to 1  
(0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 14.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 2 (6-8-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Look | Eyes | Help | Run | Fall | Blind | Beat | Accompany | Glasses | Obstacle | Move | Miracle | Feed | Read | Hand\* | Wheels | Stairs | Accident | Fall\* | Work | Sight | Listen | Scold | Attentive |
| Look | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Eyes | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Help | .007 | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Run | .011 | .007 | .003 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fall | .011 | .007 | .003 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Blind | .011 | .007 | .003 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Beat | .011 | .007 | .003 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Accompany | .011 | .007 | .003 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Glasses | .011 | .007 | .003 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Obstacle | .011 | .007 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Move | .011 | .007 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Miracle | .011 | .007 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Feed | .011 | .008 | .004 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Read | .012 | .008 | .004 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |
| Hand\* | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Wheels | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Stairs | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Accident | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Fall\* | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |
| Work | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |
| Sight | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Listen | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| Scold | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Attentive | .012 | .009 | .005 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 24 stems with higher tf-idf in the 6-8 years old children’s text corpus of answers to open-ended Question 2 are reported. Euclidean distances are reported on a scale with units from 0 to 1  
(0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 15.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 3 (6-8-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Listen | Hear | Fault | Underst\* | Offen\* | God | Face | Smart | Orient | Weird | Scold |
| Listen | 0 |  |  |  |  |  |  |  |  |  |  |
| Hear | .003 | 0 |  |  |  |  |  |  |  |  |  |
| Fault | .008 | .005 | 0 |  |  |  |  |  |  |  |  |
| Underst\* | .008 | .005 | 0 | 0 |  |  |  |  |  |  |  |
| Offen\* | .008 | .005 | 0 | 0 | 0 |  |  |  |  |  |  |
| God | .012 | .009 | .004 | .004 | .004 | 0 |  |  |  |  |  |
| Face | .012 | .009 | .004 | .004 | .004 | 0 | 0 |  |  |  |  |
| Smart | .012 | .009 | .004 | .004 | .004 | 0 | 0 | 0 |  |  |  |
| Orient | .012 | .009 | .004 | .004 | .004 | 0 | 0 | 0 | 0 |  |  |
| Weird | .012 | .009 | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 |  |
| Scold | .012 | .009 | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 11 stems with higher tf-idf in the 6-8 years old children’s text corpus of answers to open-ended Question 3 are reported. Euclidean distances are reported on a scale with units from 0 to 1   
(0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 16.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Question 4 (6-8-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Argue | Break | Leg\* | Eyes | Work\* | Lucky | Healthy | Foot | Stupid | Nose | Ear\* | Read | Mate\* | Sight | Broken |
| Argue | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Break | .005 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Leg\* | .011 | .005 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Eyes | .016 | .011 | .005 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Work\* | .016 | .011 | .005 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Lucky | .016 | .011 | .005 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Healthy | .016 | .011 | .005 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Foot | .016 | .011 | .005 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Stupid | .016 | .011 | .005 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Nose | .016 | .011 | .005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |
| Ear\* | .018 | .013 | .007 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | 0 |  |  |  |  |
| Read | .018 | .013 | .008 | .003 | .003 | .003 | .003 | .003 | .003 | .003 | .001 | 0 |  |  |  |
| Mate\* | .018 | .013 | .008 | .003 | .003 | .003 | .003 | .003 | .003 | .003 | .001 | 0 | 0 |  |  |
| Sight | .018 | .013 | .008 | .003 | .003 | .003 | .003 | .003 | .003 | .003 | .001 | 0 | 0 | 0 |  |
| Broken | .018 | .013 | .008 | .003 | .003 | .003 | .003 | .003 | .003 | .003 | .001 | 0 | 0 | 0 | 0 |

Euclidean distance between the 16 stems with higher tf-idf in the 6-8 years old children’s text corpus of answers to open-ended Question 4 are reported. Euclidean distances are reported on a scale with units from 0 to 1   
(0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 17.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Medical Model of Disability  
(6-8-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | See | Do | Succeed | Beat | Leg\* | Underst\* | Help | Problem\* | Run | Sick | Stairs | Walk | Listen | Write | Blind | Born | Hear | Fall\* | Sport | Read | Broken | Wheel | Cure | Hand\* | Foot | Push | Play | Alone | Accident | Homeworks | Look | School | Difficulty\* | God | Break | Arm | Descend |
| See | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Do | .021 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Succeed | .025 | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Beat | .032 | .011 | .007 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Leg\* | .033 | .013 | .009 | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Underst\* | .034 | .014 | .010 | .003 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Help | .037 | .016 | .012 | .005 | .004 | .003 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Problem\* | .037 | .017 | .013 | .006 | .004 | .003 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Run | .038 | .017 | .013 | .006 | .004 | .004 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sick | .038 | .017 | .013 | .006 | .004 | .004 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Stairs | .038 | .017 | .013 | .006 | .004 | .004 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Walk | .038 | .017 | .013 | .006 | .004 | .004 | .001 | 0 | .004 | .004 | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Listen | .039 | .018 | .014 | .007 | .005 | .004 | .002 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Write | .039 | .018 | .014 | .007 | .005 | .004 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Blind | .040 | .020 | .016 | .009 | .007 | .006 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Born | .040 | .020 | .016 | .009 | .007 | .006 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hear | .041 | .020 | .016 | .009 | .008 | .007 | .004 | .004 | .003 | .003 | .003 | .003 | .002 | .002 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fall\* | .041 | .021 | .017 | .010 | .008 | .007 | .004 | .004 | .004 | .004 | .004 | .003 | .003 | .003 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sport | .041 | .021 | .017 | .010 | .008 | .007 | .004 | .004 | .004 | .004 | .004 | .003 | .003 | .003 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Read | .041 | .021 | .017 | .010 | .008 | .007 | .004 | .004 | .004 | .004 | .004 | .003 | .003 | .003 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Broken | .042 | .021 | .017 | .010 | .008 | .007 | .005 | .004 | .004 | .004 | .004 | .004 | .003 | .003 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Wheel | .042 | .021 | .018 | .010 | .009 | .008 | .005 | .005 | .004 | .004 | .004 | .004 | .004 | .004 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cure | .042 | .021 | .018 | .010 | .009 | .008 | .005 | .005 | .004 | .004 | .004 | .004 | .004 | .004 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hand\* | .042 | .021 | .018 | .010 | .009 | .008 | .005 | .005 | .004 | .004 | .004 | .004 | .004 | .004 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | See | Do | Succeed | Beat | Leg\* | Underst\* | Help | Problem\* | Run | Sick | Stairs | Walk | Listen | Write | Blind | Born | Hear | Fall\* | Sport | Read | Broken | Wheel | Cure | Hand\* | Foot | Push | Play | Alone | Accident | Homeworks | Look | School | Difficulty\* | God | Break | Arm | Descend |
| Foot | .042 | .021 | .018 | .010 | .009 | .008 | .005 | .005 | .004 | .004 | .004 | .004 | .004 | .004 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Push | .042 | .022 | .018 | .011 | .009 | .008 | .005 | .005 | .005 | .005 | .005 | .005 | .004 | .004 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Play | .043 | .022 | .018 | .011 | .010 | .009 | .006 | .006 | .005 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |
| Alone | .043 | .022 | .018 | .011 | .010 | .009 | .006 | .006 | .005 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Accident | .043 | .022 | .018 | .011 | .010 | .009 | .006 | .006 | .005 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Home-works | .043 | .022 | .018 | .011 | .010 | .009 | .006 | .006 | .005 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Look | .043 | .023 | .019 | .012 | .010 | .009 | .006 | .006 | .006 | .006 | .006 | .005 | .005 | .005 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| School | .044 | .023 | .019 | .012 | .010 | .010 | .007 | .006 | .006 | .006 | .006 | .006 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |
| Difficulty\* | .044 | .023 | .019 | .012 | .010 | .010 | .007 | .006 | .006 | .006 | .006 | .006 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |
| God | .044 | .023 | .019 | .012 | .010 | .010 | .007 | .006 | .006 | .006 | .006 | .006 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |
| Break | .044 | .023 | .019 | .012 | .010 | .010 | .007 | .006 | .006 | .006 | .006 | .006 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |
| Arm | .044 | .023 | .019 | .012 | .010 | .010 | .007 | .006 | .006 | .006 | .006 | .006 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |
| Descend | .044 | .03 | .019 | .012 | .010 | .010 | .007 | .006 | .006 | .006 | .006 | .006 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 37 stems with higher tf-idf in the 6-8 years old children’s text corpus of answers coded with medical model are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 18.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Social Model of Disability (6-8-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Offen\* | Do | Friend\* | Problem\* | Blind | Fault | Climb | Punch | Suffer | Mates | Behave | Weird | School |
| Offen\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Do | .007 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Friend\* | .007 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Problem\* | .013 | .005 | .005 | 0 |  |  |  |  |  |  |  |  |  |
| Blind | .014 | .007 | .007 | .002 | 0 |  |  |  |  |  |  |  |  |
| Fault | .014 | .007 | .007 | .002 | 0 | 0 |  |  |  |  |  |  |  |
| Climb | .014 | .007 | .007 | .002 | 0 | 0 | 0 |  |  |  |  |  |  |
| Punch | .014 | .007 | .007 | .002 | 0 | 0 | 0 | 0 |  |  |  |  |  |
| Suffer | .014 | .007 | .007 | .002 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |
| Mates | .014 | .007 | .007 | .002 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Behave | .014 | .007 | .007 | .002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| Weird | .018 | .010 | .010 | .005 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | 0 |  |
| School | .018 | .010 | .010 | .005 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | 0 | 0 |

Euclidean distance between the 13 stems with higher tf-idf in the 6-8 years old children’s text corpus of answers coded with social model are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 19.** Euclidean Distance Matrix between Stems with higher with higher Tf-Idf in Question 1 (9-11-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Leg\* | Climb | Push | Stairs | Pram | Gymnastic | Sport\* | Rejected | Crutches | Help | Accident | Broken | Descend | Ill | Hand\* | Malformation | Humiliate |
| Leg\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Climb | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Push | .007 | .007 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Stairs | .008 | .008 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pram | .008 | .008 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Gymnastic | .009 | .009 | .002 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Sport\* | .011 | .011 | .004 | .002 | .002 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |
| Rejected | .012 | .012 | .005 | .004 | .004 | .002 | .001 | 0 |  |  |  |  |  |  |  |  |  |
| Crutches | .012 | .012 | .005 | .004 | .004 | .002 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |
| Help | .012 | .012 | .005 | .004 | .004 | .003 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Accident | .013 | .013 | .006 | .005 | .005 | .004 | .002 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |
| Broken | .013 | .013 | .006 | .005 | .005 | .004 | .002 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |
| Descend | .013 | .013 | .006 | .005 | .005 | .004 | .002 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |
| Ill | .013 | .013 | .006 | .005 | .005 | .004 | .002 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |
| Hand\* | .014 | .014 | .007 | .006 | .006 | .005 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 |  |  |
| Malformation | .014 | .014 | .007 | .006 | .006 | .005 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 |  |
| Humiliate | .014 | .014 | .007 | .006 | .006 | .005 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |

Euclidean distance between the 17 stems with higher tf-idf in the 9-11-years-old children’s text corpus of answers to open-ended Question 1 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 20.** Euclidean Distance Matrix between Stems with higher with higher Tf-Idf in Question 2 (9-11-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Fall\* | Eye\* | Help | Sight | Ears | Orient | Walk | Stair\* | Accompany | Move | Support | Smell | Intelligent | Obstacles | Pranks | Bad marks | Write | Read |
| Fall\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Eye\* | .005 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Help | .008 | .003 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sight | .008 | .004 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ears | .009 | .005 | .002 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Orient | .009 | .005 | .002 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Walk | .010 | .005 | .002 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Stair\* | .011 | .006 | .003 | .002 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |
| Accompany | .011 | .006 | .003 | .002 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Move | .011 | .006 | .003 | .002 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Support | .011 | .006 | .003 | .002 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Smell | .012 | .007 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |
| Intelligent | .012 | .007 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |
| Obstacles | .012 | .007 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |
| Pranks | .012 | .007 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |
| Bad marks | .012 | .007 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |
| Write | .012 | .007 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Read | .012 | .007 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 18 stems with higher tf-idf in the 9-11-years-old children’s text corpus of answers to open-ended Question 2 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 21.** Euclidean Distance Matrix between Stems with higher with higher Tf-Idf in Question 3 (9-11-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Communicate | Class | Express | Isolate | Invite | Mates | Sight | Sport\* | Leave | Accept | Understand | God | Avoid | Inferior | Uncaring | Stupid | Stubborn | Exploit | Fault |
| Communicate | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Class | .003 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Express | .003 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Isolate | .005 | .003 | .003 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Invite | .005 | .003 | .003 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mates | .007 | .005 | .005 | .002 | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sight | .008 | .005 | .005 | .003 | .003 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Sport\* | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Leave | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Accept | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Understand | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| God | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Avoid | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Inferior | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |
| Uncaring | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |
| Stupid | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Stubborn | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| Exploit | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Fault | .008 | .005 | .005 | .003 | .003 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 19 stems with higher tf-idf in the 9-11-years-old children’s text corpus of answers to open-ended Question 3 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 22.** Euclidean Distance Matrix between Stems with higher with higher Tf-Idf in Question 4 (9-11-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ill\* | Flaw\* | Suffer | Dyslex\* | Leave | Leg\* | Physical | Ability | Ignorant | Break | Stupid | Stalking | Shy | Quiet | Dysgraphia | Aside | Steal | Insult |
| Ill\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Flaw\* | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Suffer | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Dyslex\* | .004 | .004 | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Leave | .004 | .004 | .004 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Leg\* | .004 | .004 | .004 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Physical | .004 | .004 | .004 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Ability | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Ignorant | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Break | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Stupid | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Stalking | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Shy | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |
| Quiet | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |
| Dysgraphia | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Aside | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| Steal | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Insult | .004 | .004 | .004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 18 stems with higher tf-idf in the 9-11-years-old children’s text corpus of answers to open-ended Question 4 are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 23.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Medical Model of Disability  
(9-11-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Walk | See | Underst\* | Hear | Leg\* | Problem\* | Ill | Stair\* | Write | Succeed | Help | Pram | Play | Stand up | Listen | Read | Sport\* | Friend\* | Bad | Fall | Isolate | Break | School | Born | Eye\* | Suffer | Amuse\* | Foot | Push | Blind | Accident | Descend | Accompany | Express | Gymnastic | Move | Climb | Difficulty |
| Walk | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| See | .013 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Underst\* | .017 | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hear | .017 | .004 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Leg\* | .020 | .007 | .004 | .004 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Problem\* | .020 | .008 | .004 | .004 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ill | .021 | .008 | .004 | .004 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Stair\* | .022 | .010 | .006 | .006 | .002 | .002 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Write | .022 | .010 | .006 | .006 | .002 | .002 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Succeed | .023 | .010 | .006 | .006 | .002 | .002 | .002 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Help | .024 | .011 | .007 | .007 | .003 | .003 | .002 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pram | .024 | .011 | .007 | .007 | .004 | .003 | .003 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Play | .024 | .011 | .007 | .007 | .004 | .004 | .003 | .002 | .002 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Stand up | .025 | .012 | .008 | .008 | .004 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Listen | .025 | .012 | .008 | .008 | .004 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Read | .025 | .012 | .008 | .008 | .004 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sport\* | .025 | .012 | .008 | .008 | .004 | .004 | .004 | .002 | .002 | .002 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Friend\* | .025 | .012 | .008 | .008 | .005 | .005 | .004 | .003 | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bad | .025 | .012 | .008 | .008 | .005 | .005 | .004 | .003 | .003 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fall | .025 | .012 | .008 | .008 | .005 | .005 | .004 | .003 | .003 | .003 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Isolate | .025 | .012 | .009 | .008 | .005 | .005 | .004 | .003 | .003 | .003 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Break | .026 | .013 | .009 | .009 | .006 | .006 | .005 | .004 | .004 | .003 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| School | .026 | .013 | .009 | .009 | .006 | .006 | .005 | .004 | .004 | .003 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Born | .026 | .013 | .009 | .009 | .006 | .006 | .005 | .004 | .004 | .003 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 23.** (Continued)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Walk | See | Underst\* | Hear | Leg\* | Problem\* | Ill | Stair\* | Write | Succeed | Help | Pram | Play | Stand up | Listen | Read | Sport\* | Friend\* | Bad | Fall | Isolate | Break | School | Born | Eye\* | Suffer | Amuse\* | Foot | Push | Blind | Accident | Descend | Accompany | Express | Gymnastic | Move | Climb | Difficulty |
| Eye\* | .027 | .014 | .010 | .010 | .006 | .006 | .006 | .004 | .004 | .004 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Suffer | .027 | .014 | .010 | .010 | .006 | .006 | .006 | .004 | .004 | .004 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Amuse\* | .027 | .014 | .010 | .010 | .006 | .006 | .006 | .004 | .004 | .004 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Foot | .027 | .014 | .010 | .010 | .006 | .006 | .006 | .004 | .004 | .004 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Push | .027 | .014 | .010 | .010 | .006 | .006 | .006 | .004 | .004 | .004 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Blind | .027 | .014 | .010 | .010 | .006 | .006 | .006 | .004 | .004 | .004 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Accident | .027 | .014 | .010 | .010 | .006 | .006 | .006 | .004 | .004 | .004 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Descend | .027 | .014 | .010 | .010 | .007 | .007 | .006 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Accompany | .027 | .014 | .011 | .011 | .007 | .007 | .006 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 |  |  |  |  |  |
| Express | .027 | .014 | .011 | .011 | .007 | .007 | .006 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 |  |  |  |  |
| Gymnastic | .027 | .014 | .011 | .011 | .007 | .007 | .006 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 |  |  |  |
| Move | .027 | .014 | .011 | .011 | .007 | .007 | .006 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 |  |  |
| Climb | .027 | .014 | .011 | .011 | .007 | .007 | .006 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Difficulty | .027 | .014 | .011 | .011 | .007 | .007 | .006 | .005 | .005 | .005 | .004 | .004 | .003 | .003 | .003 | .003 | .003 | .002 | .002 | .002 | .002 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 38 stems with higher tf-idf in the 9-11-years-old children’s text corpus of answers coded with medical model are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 24.** Euclidean Distance Matrix between Stems with higher Tf-Idf in Social Model of Disability  
(9-11-years-old group)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Problem\* | Leave | Exclude\* | Friend\* | Mate\* | Cheat | Underst\* | Bad | Difficulty\* | Exploit | Avoid | Ignorant | Insult | Uncaring | Stupid | Stalking | Humiliate | Consider | Define | Aside | Pain | Steal | Bad marks | Weird |
| Problem\* | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Leave | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Exclude\* | .004 | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Friend\* | .006 | .005 | .002 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mate\* | .006 | .005 | .002 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cheat | .008 | .006 | .003 | .001 | .001 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Underst\* | .011 | .009 | .006 | .004 | .004 | .003 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bad | .011 | .009 | .006 | .004 | .004 | .003 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Difficulty\* | .011 | .009 | .006 | .004 | .004 | .003 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Exploit | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Avoid | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ignorant | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |  |
| Insult | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |  |
| Uncaring | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |  |
| Stupid | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |
| Stalking | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Humiliate | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |
| Consider | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |
| Define | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  |
| Aside | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |
| Pain | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Steal | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| Bad marks | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Weird | .013 | .011 | .009 | .007 | .007 | .006 | .003 | .003 | .003 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Euclidean distance between the 24 stems with higher tf-idf in the 9-11-years-old children’s text corpus of answers coded with social model are reported. Euclidean distances are reported on a scale with units from 0 to 1 (0 = maximum proximity/similarity; 1 = maximum distance/dissimilarity).

**Table 25.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 1 (parents’ group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Walk | Infrastructures | 0 | 0 | 0 | 10 |
| 2 | Wheelchair | Actions | 0 | 0 | 0 | 9 |
| 3 | Facilities | Stairs | 0 | 0 | 0 | 7 |
| 4 | City | Independent\* | 0 | 0 | 0 | 5 |
| 5 | Go | City | 0 | 0 | 4 | 9 |
| 6 | Mov\* | Function\* | .001 | 0 | 0 | 11 |
| 7 | Facilities | Legs | .001 | 3 | 0 | 11 |
| 8 | Barriers | Architectural | .001 | 0 | 0 | 13 |
| 9 | Wheelchair | Go | .001 | 2 | 5 | 10 |
| 10 | Wheelchair | Walk | .002 | 9 | 1 | 12 |
| 11 | Facilities | Mov\* | .002 | 7 | 6 | 12 |
| 12 | Facilities | Wheelchair | .006 | 11 | 10 | 13 |
| 13 | Barriers | Facilities | .009 | 8 | 12 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 11).

**Table 26.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 2 (parents’ group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Move | Dog | 0 | 0 | 0 | 3 |
| 2 | Independent | Obstacles | 0 | 0 | 0 | 4 |
| 3 | Move | Go | .001 | 1 | 0 | 4 |
| 4 | Move | Independent | .001 | 3 | 2 | 6 |
| 5 | Read | Lead | .002 | 0 | 0 | 6 |
| 6 | Read | Move | .004 | 5 | 4 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 5).

**Table 27.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 3 (parents’ group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Sick\* | Relat\* | 0 | 0 | 0 | 2 |
| 2 | Underst\* | Sick\* | 0 | 0 | 1 | 7 |
| 3 | Express | Interact | 0 | 0 | 0 | 4 |
| 4 | Peers | Express | 0 | 0 | 3 | 5 |
| 5 | Self-sufficient | Peers | 0 | 0 | 4 | 8 |
| 6 | Learn\* | Classmates | 0 | 0 | 0 | 11 |
| 7 | Underst\* | Integrate | .001 | 2 | 0 | 9 |
| 8 | World | Self-sufficient | 0 | 0 | 5 | 10 |
| 9 | Underst\* | Known | 0 | 7 | 0 | 12 |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 10 | World | Isol\* | .001 | 8 | 0 | 12 |
| 11 | Communic\* | Learn\* | .001 | 0 | 6 | 13 |
| 12 | World | Underst\* | .001 | 10 | 9 | 13 |
| 13 | Communic\* | World | .003 | 11 | 12 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 12).

**Table 28.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 4 (parents’ group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Relat\* | Connections | 0 | 0 | 0 | 8 |
| 2 | Health | Shy | 0 | 0 | 0 | 3 |
| 3 | Commit\* | Health | 0 | 0 | 2 | 4 |
| 4 | Satisfy | Commit\* | 0 | 0 | 3 | 6 |
| 5 | Deal | Create | 0 | 0 | 0 | 6 |
| 6 | Satisfy | Deal | .001 | 4 | 5 | 8 |
| 7 | Sourmount\* | Solve | .001 | 0 | 0 | 9 |
| 8 | Satisfy | Relat\* | .002 | 6 | 1 | 9 |
| 9 | Sourmount\* | Satisfy | .004 | 7 | 8 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 8).

**Table 29.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Medical Model (parents’ group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Natur\* | Surpass | 0 | 0 | 0 | 9 |
| 2 | Limit\* | Suffer\* | 0 | 0 | 0 | 3 |
| 3 | Fortun\* | Limit\* | 0 | 0 | 2 | 4 |
| 4 | Physical | Fortun\* | 0 | 0 | 3 | 8 |
| 5 | Mov\* | Perceiv\* | 0 | 0 | 0 | 6 |
| 6 | Mov\* | Autonom\* | 0 | 5 | 0 | 11 |
| 7 | Body | Unlucky | 0 | 0 | 0 | 9 |
| 8 | Physical | Sick | 0 | 4 | 0 | 11 |
| 9 | Natur\* | Body | 0 | 1 | 7 | 12 |
| 10 | Succed\* | Deal | 0 | 0 | 0 | 13 |
| 11 | Physical | Mov\* | 0 | 8 | 6 | 12 |
| 12 | Physical | Natur\* | .001 | 11 | 9 | 13 |
| 13 | Succed\* | Fortun\* | .003 | 10 | 12 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 12).

**Table 30.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Social Model (parents’ group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Selfish | Involved | 0 | 0 | 0 | 2 |
| 2 | Indifference | Selfish | 0 | 0 | 1 | 4 |
| 3 | Enviroment\* | Barriers | 0 | 0 | 0 | 5 |
| 4 | Indifference | Accept | 0 | 2 | 0 | 7 |
| 5 | Enviroment\* | Architectural | 0 | 3 | 0 | 8 |
| 6 | Mov\* | Go | 0 | 0 | 0 | 10 |
| 7 | Comprehen\* | Indifference | 0 | 0 | 4 | 9 |
| 8 | Help\* | Enviroment\* | 0 | 0 | 5 | 10 |
| 9 | Underst\* | Comprehen\* | .001 | 0 | 7 | 11 |
| 10 | Mov\* | Help\* | .001 | 6 | 8 | 11 |
| 11 | Mov\* | Underst\* | .002 | 10 | 9 | 12 |
| 12 | Marginalis\* | Mov\* | .004 | 0 | 11 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 11).

**Table 31.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Social Model (parents’ group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Services | Will | 0 | 0 | 0 | 2 |
| 2 | Personality | Services | 0 | 0 | 1 | 3 |
| 3 | Ideas | Personality | 0 | 0 | 2 | 4 |
| 4 | Buildings | Ideas | 0 | 0 | 3 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 1).

**Table 32.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 1 (6-8-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Force | Move | 0 | 0 | 0 | 2 |
| 2 | Stand up | Force | 0 | 0 | 1 | 3 |
| 3 | Fall\* | Stand up | 0 | 0 | 2 | 4 |
| 4 | Foot | Fall\* | 0 | 0 | 3 | 5 |
| 5 | Broken | Foot | 0 | 0 | 4 | 8 |
| 6 | Descend | Run | 0 | 0 | 0 | 7 |
| 7 | Sport\* | Descend | 0 | 0 | 6 | 11 |
| 8 | Broken | Accident | .001 | 5 | 0 | 13 |
| 9 | Leg\* | Pram | .001 | 0 | 0 | 11 |
| 10 | Stairs | Push | .001 | 0 | 0 | 12 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 11 | Leg\* | Sport\* | .004 | 9 | 7 | 13 |
| 12 | Climb | Stairs | .006 | 0 | 10 | 14 |
| 13 | Leg\* | Broken | .008 | 11 | 8 | 14 |
| 14 | Climb | Leg\* | .015 | 12 | 13 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 13).

**Table 33.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 2 (6-8-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Scold | Attentive | 0 | 0 | 0 | 2 |
| 2 | Listen | Scold | 0 | 0 | 1 | 3 |
| 3 | Sight | Listen | 0 | 0 | 2 | 4 |
| 4 | Work | Sight | 0 | 0 | 3 | 5 |
| 5 | Fall\* | Work | 0 | 0 | 4 | 6 |
| 6 | Accident | Fall\* | 0 | 0 | 5 | 7 |
| 7 | Stairs | Accident | 0 | 0 | 6 | 8 |
| 8 | Wheels | Stairs | 0 | 0 | 7 | 9 |
| 9 | Hand\* | Wheels | 0 | 0 | 8 | 18 |
| 10 | Move | Miracle | 0 | 0 | 0 | 11 |
| 11 | Obstacle | Move | 0 | 0 | 10 | 12 |
| 12 | Glasses | Obstacles | 0 | 0 | 11 | 13 |
| 13 | Accompany | Glasses | 0 | 0 | 12 | 14 |
| 14 | Beat | Accompany | 0 | 0 | 13 | 15 |
| 15 | Blind | Beat | 0 | 0 | 14 | 16 |
| 16 | Fall | Blind | 0 | 0 | 15 | 17 |
| 17 | Run | Fall | 0 | 0 | 16 | 19 |
| 18 | Read | Hand\* | 0 | 0 | 9 | 20 |
| 19 | Run | Feed | .001 | 17 | 0 | 20 |
| 20 | Run | Read | .002 | 19 | 18 | 22 |
| 21 | Look | Eyes | .004 | 0 | 0 | 23 |
| 22 | Help | Run | .005 | 0 | 20 | 23 |
| 23 | Look | Scold | .012 | 21 | 22 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 22).

**Table 34.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 3 (6-8-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Weird | Scold | 0 | 0 | 0 | 2 |
| 2 | Orient | Weird | 0 | 0 | 1 | 3 |
| 3 | Smart | Orient | 0 | 0 | 2 | 4 |
| 4 | Face | Smart | 0 | 0 | 3 | 5 |
| 5 | God | Face | 0 | 0 | 4 | 9 |
| 6 | Underst\* | Offen\* | 0 | 0 | 0 | 7 |
| 7 | Fault | Underst\* | 0 | 0 | 6 | 9 |
| 8 | Listen | Hear | .003 | 0 | 0 | 10 |
| 9 | Fault | God | .004 | 7 | 5 | 10 |
| 10 | Listen | Fault | .012 | 8 | 9 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 9).

**Table 35.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 4 (6-8-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Sight | Broken | 0 | 0 | 0 | 2 |
| 2 | Mate\* | Sight | 0 | 0 | 1 | 3 |
| 3 | Read | Mate\* | 0 | 0 | 2 | 10 |
| 4 | Stupid | Nose | 0 | 0 | 0 | 5 |
| 5 | Foot | Stupid | 0 | 0 | 4 | 6 |
| 6 | Healthy | Foot | 0 | 0 | 5 | 7 |
| 7 | Lucky | Healthy | 0 | 0 | 6 | 8 |
| 8 | Work\* | Lucky | 0 | 0 | 7 | 9 |
| 9 | Eyes | Work\* | 0 | 0 | 8 | 11 |
| 10 | Ear\* | Read | .001 | 0 | 3 | 11 |
| 11 | Eyes | Ear\* | .003 | 9 | 10 | 14 |
| 12 | Break | Leg\* | .005 | 0 | 0 | 13 |
| 13 | Argue | Break | .011 | 0 | 12 | 14 |
| 14 | Argue | Eyes | .018 | 13 | 11 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 13).

**Table 36.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Medical Model of Disability (6-8-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Arm | Descend | 0 | 0 | 0 | 2 |
| 2 | Break | Arm | 0 | 0 | 1 | 3 |
| 3 | God | Break | 0 | 0 | 2 | 4 |
| 4 | Difficulty | God | 0 | 0 | 3 | 5 |
| 5 | School | Difficult\* | 0 | 0 | 4 | 26 |
| 6 | Accident | Homeworks | 0 | 0 | 0 | 7 |
| 7 | Alone | Accident | 0 | 0 | 6 | 18 |
| 8 | Hand\* | Foot | 0 | 0 | 0 | 9 |
| 9 | Cure | Hand\* | 0 | 0 | 8 | 10 |
| 10 | Wheel | Cure | 0 | 0 | 9 | 19 |
| 11 | Sport | Read | 0 | 0 | 0 | 12 |
| 12 | Fall\* | Sport | 0 | 0 | 11 | 20 |
| 13 | Blind | Born | 0 | 0 | 0 | 27 |
| 14 | Listen | Write | 0 | 0 | 0 | 29 |
| 15 | Sick | Stairs | 0 | 0 | 0 | 16 |
| 16 | Run | Sick | 0 | 0 | 15 | 17 |
| 17 | Run | Walk | .004 | 16 | 0 | 22 |
| 18 | Play | Alone | 0 | 0 | 7 | 21 |
| 19 | Wheel | Push | 0 | 10 | 0 | 28 |
| 20 | Hear | Fall\* | 0 | 0 | 12 | 23 |
| 21 | Play | Look | 0 | 18 | 0 | 26 |
| 22 | Problem\* | Run | 0 | 0 | 17 | 25 |
| 23 | Hear | Broken | .001 | 20 | 0 | 27 |
| 24 | Leg\* | Underst\* | .001 | 0 | 0 | 30 |
| 25 | Help | Problem\* | .001 | 0 | 22 | 29 |
| 26 | Play | School | .001 | 21 | 5 | 28 |
| 27 | Blind | Hear | .001 | 13 | 23 | 31 |
| 28 | Wheel | Play | .002 | 19 | 26 | 31 |
| 29 | Help | Listen | .002 | 25 | 14 | 33 |
| 30 | Beat | Leg\* | .003 | 0 | 24 | 34 |
| 31 | Blind | Wheel | .004 | 27 | 28 | 33 |
| 32 | Do | Succeed | .004 | 0 | 0 | 35 |
| 33 | Help | Blind | .007 | 29 | 31 | 34 |
| 34 | Beat | Help | .012 | 30 | 33 | 35 |
| 35 | Do | Beat | .023 | 32 | 34 | 36 |
| 36 | See | Do | .044 | 0 | 35 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 35).

**Table 37.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Social Model of Disability (6-8-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Weird | School | 0 | 0 | 0 | 10 |
| 2 | Mates | Behave | 0 | 0 | 0 | 3 |
| 3 | Suffer | Mates | 0 | 0 | 2 | 4 |
| 4 | Punch | Suffer | 0 | 0 | 3 | 5 |
| 5 | Climb | Punch | 0 | 0 | 4 | 6 |
| 6 | Fault | Climb | 0 | 0 | 5 | 7 |
| 7 | Blind | Fault | 0 | 0 | 6 | 9 |
| 8 | Do | Friend\* | 0 | 0 | 0 | 11 |
| 9 | Problem\* | Blind | .002 | 0 | 7 | 10 |
| 10 | Problem\* | Weird | .005 | 9 | 1 | 12 |
| 11 | Offend\* | Do | .007 | 0 | 8 | 12 |
| 12 | Offend\* | Problem\* | .018 | 11 | 10 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 11).

**Table 38.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 1 (9-11-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Malformation | Humiliate | 0 | 0 | 0 | 2 |
| 2 | Hand\* | Malformation | 0 | 0 | 1 | 11 |
| 3 | Broken | Descend | 0 | 0 | 0 | 4 |
| 4 | Accident | Broken | 0 | 0 | 3 | 8 |
| 5 | Rejected | Crutches | 0 | 0 | 0 | 9 |
| 6 | Stairs | Pram | 0 | 0 | 0 | 10 |
| 7 | Leg\* | Climb | 0 | 0 | 0 | 16 |
| 8 | Accident | Ill | 0 | 4 | 0 | 11 |
| 9 | Rejected | Help | 0 | 5 | 0 | 13 |
| 10 | Push | Stairs | .001 | 0 | 6 | 14 |
| 11 | Accident | Hand\* | .001 | 8 | 2 | 13 |
| 12 | Gymnastic | Sport\* | .001 | 0 | 0 | 14 |
| 13 | Rejected | Accident | .002 | 9 | 11 | 15 |
| 14 | Push | Gymnastic | .004 | 10 | 12 | 15 |
| 15 | Push | Rejected | .007 | 14 | 13 | 16 |
| 16 | Leg\* | Push | .014 | 7 | 15 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 15).

**Table 39.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 2 (9-11-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Write | Read | 0 | 0 | 1 | 3 |
| 2 | Bad Marks | Write | 0 | 0 | 2 | 4 |
| 3 | Pranks | Bad Marks | 0 | 0 | 3 | 5 |
| 4 | Obstacles | Pranks | 0 | 0 | 4 | 6 |
| 5 | Intelligent | Obstacles | 0 | 0 | 5 | 7 |
| 6 | Smell | Intelligent | 0 | 0 | 6 | 14 |
| 7 | Move | Support | 0 | 0 | 0 | 11 |
| 8 | Stair\* | Accompany | 0 | 0 | 0 | 11 |
| 9 | Ears | Orient | 0 | 0 | 0 | 12 |
| 10 | Stair\* | Move | 0 | 9 | 8 | 14 |
| 11 | Ears | Walk | 0 | 10 | 0 | 15 |
| 12 | Help | Sight | 0 | 0 | 0 | 15 |
| 13 | Stair\* | Smell | .001 | 11 | 7 | 16 |
| 14 | Help | Ears | .002 | 13 | 12 | 16 |
| 15 | Help | Stair\* | .004 | 15 | 14 | 18 |
| 16 | Fall\* | Eye\* | .005 | 0 | 0 | 18 |
| 17 | Fall\* | Help | .012 | 17 | 16 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 16).

**Table 40.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 3 (9-11-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Exploit | Fault | 0 | 0 | 0 | 2 |
| 2 | Stubborn | Exploit | 0 | 0 | 1 | 3 |
| 3 | Stupid | Stubborn | 0 | 0 | 2 | 4 |
| 4 | Uncaring | Stupid | 0 | 0 | 3 | 5 |
| 5 | Inferior | Uncaring | 0 | 0 | 4 | 6 |
| 6 | Avoid | Inferior | 0 | 0 | 5 | 7 |
| 7 | God | Avoid | 0 | 0 | 6 | 8 |
| 8 | Underst\* | God | 0 | 0 | 7 | 9 |
| 9 | Accept | Underst\* | 0 | 0 | 8 | 10 |
| 10 | Leave | Accept | 0 | 0 | 9 | 11 |
| 11 | Sport\* | Leave | 0 | 0 | 10 | 12 |
| 12 | Sight | Sport\* | 0 | 0 | 11 | 15 |
| 13 | Isolate | Invite | 0 | 0 | 0 | 16 |
| 14 | Class | Express | 0 | 0 | 0 | 16 |
| 15 | Mates | Sight | .001 | 0 | 12 | 17 |
| 16 | Class | Isolate | .003 | 14 | 13 | 17 |
| 17 | Class | Mates | .005 | 16 | 15 | 18 |
| 18 | Communicate | Class | .008 | 0 | 17 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 17).

**Table 41.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Question 4 (9-11-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Steal | Insult | 0 | 0 | 0 | 2 |
| 2 | Aside | Steal | 0 | 0 | 1 | 3 |
| 3 | Dysgraphia | Aside | 0 | 0 | 2 | 4 |
| 4 | Quiet | Dysgraphia | 0 | 0 | 3 | 5 |
| 5 | Shy | Quiet | 0 | 0 | 4 | 6 |
| 6 | Stalking | Shy | 0 | 0 | 5 | 7 |
| 7 | Stalking | Stalking | 0 | 0 | 6 | 8 |
| 8 | Stupid | Stupid | 0 | 0 | 7 | 9 |
| 9 | Ignorant | Break | 0 | 0 | 8 | 10 |
| 10 | Ability | Ignorant | 0 | 0 | 9 | 11 |
| 11 | Physical | Ability | 0 | 0 | 10 | 12 |
| 12 | Leg\* | Physical | 0 | 0 | 11 | 13 |
| 13 | Leave | Leg\* | 0 | 0 | 12 | 17 |
| 14 | Suffer | Dyslex\* | 0 | 0 | 0 | 15 |
| 15 | Flaw\* | Suffer | 0 | 0 | 14 | 16 |
| 16 | Ill | Flaw\* | 0 | 0 | 15 | 17 |
| 17 | Ill | Leave | .004 | 16 | 13 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 16).

**Table 42.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Medical Model of Disability (9-11-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Difficulty | Difficulty | 0 | 0 | 1 | 3 |
| 2 | Move | Climb | 0 | 0 | 2 | 4 |
| 3 | Gymnastic | Move | 0 | 0 | 3 | 5 |
| 4 | Express | Gymnastic | 0 | 0 | 4 | 6 |
| 5 | Accompany | Express | 0 | 0 | 5 | 24 |
| 6 | Blind | Accident | 0 | 0 | 0 | 8 |
| 7 | Push | Blind | 0 | 0 | 7 | 9 |
| 8 | Foot | Push | 0 | 0 | 8 | 10 |
| 9 | Amuse\* | Foot | 0 | 0 | 9 | 11 |
| 10 | Suffer | Amuse\* | 0 | 0 | 10 | 19 |
| 11 | School | Born | 0 | 0 | 0 | 13 |
| 12 | Break | School | 0 | 0 | 12 | 28 |
| 13 | Friend\* | Bad | 0 | 0 | 0 | 25 |
| 14 | Read | Sport\* | 0 | 0 | 0 | 16 |
| 15 | Listen | Read | 0 | 0 | 15 | 17 |
| 16 | Stand up | Listen | 0 | 0 | 16 | 30 |
| 17 | Stair\* | Write | 0 | 0 | 0 | 26 |
| 18 | Eye\* | Suffer | .001 | 0 | 11 | 28 |
| 19 | Leg\* | Problem\* | 0 | 0 | 0 | 29 |
| 20 | Underst\* | Hear | 0 | 0 | 0 | 35 |
| 21 | Fall | Isolate | 0 | 0 | 0 | 25 |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 22 | Pram | Play | 0 | 0 | 0 | 27 |
| 23 | Descend | Accompany | 0 | 0 | 6 | 31 |
| 24 | Friend\* | Fall | 0 | 14 | 22 | 30 |
| 25 | Stair\* | Succeed | 0 | 18 | 0 | 32 |
| 26 | Help | Pram | .001 | 0 | 23 | 32 |
| 27 | Break | Eye\* | .001 | 13 | 19 | 31 |
| 28 | Leg\* | Ill | .001 | 20 | 0 | 34 |
| 29 | Stand up | Bad | .001 | 17 | 25 | 33 |
| 30 | Break | Descend | .001 | 28 | 24 | 33 |
| 31 | Stair\* | Help | .002 | 26 | 27 | 34 |
| 32 | Stand up | Break | .003 | 30 | 31 | 36 |
| 33 | Leg\* | Stair\* | .004 | 29 | 32 | 36 |
| 34 | See | Underst\* | .004 | 0 | 21 | 37 |
| 35 | Leg\* | Stand up | .007 | 34 | 33 | 37 |
| 36 | See | Leg\* | .014 | 35 | 36 | 38 |
| 37 | Walk | See | .027 | 0 | 37 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 36).

**Table 43.** Agglomeration Schedule for Complete Linkage of roots with higher Tf-Idf in Social Model of Disability (9-11-years-old group)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stage 1 | Cluster Combined | | Coefficients | Stage Cluster First Appears | | Next Stage |
| Cluster 1 | Cluster 2 | Cluster 1 | Cluster 2 |
| 1 | Bad Marks | Weird | 0 | 0 | 0 | 2 |
| 2 | Steal | Bad Marks | 0 | 0 | 1 | 3 |
| 3 | Pain | Steal | 0 | 0 | 2 | 4 |
| 4 | Aside | Pain | 0 | 0 | 3 | 5 |
| 5 | Define | Aside | 0 | 0 | 4 | 6 |
| 6 | Consider | Define | 0 | 0 | 5 | 7 |
| 7 | Humiliate | Consider | 0 | 0 | 6 | 8 |
| 8 | Stalking | Humiliate | 0 | 0 | 7 | 9 |
| 9 | Stupid | Stalking | 0 | 0 | 8 | 10 |
| 10 | Uncaring | Stupid | 0 | 0 | 9 | 11 |
| 11 | Insult | Uncaring | 0 | 0 | 10 | 12 |
| 12 | Ignorant | Insult | 0 | 0 | 11 | 13 |
| 13 | Avoid | Ignorant | 0 | 0 | 12 | 14 |
| 14 | Exploit | Avoid | 0 | 0 | 13 | 20 |
| 15 | Bad | Difficulty\* | 0 | 0 | 0 | 16 |
| 16 | Underst\* | Bad | 0 | 0 | 15 | 20 |
| 17 | Friend\* | Mate\* | 0 | 0 | 0 | 18 |
| 18 | Friend\* | Cheat | .001 | 17 | 0 | 21 |
| 19 | Problem\* | Leave | .002 | 0 | 0 | 22 |
| 20 | Underst\* | Exploit | .003 | 16 | 14 | 23 |
| 21 | Exclude\* | Friend\* | .003 | 0 | 18 | 22 |
| 22 | Problem\* | Exclude\* | .008 | 19 | 21 | 23 |
| 23 | Problem\* | Underst\* | .013 | 22 | 20 | 0 |

Summary of cluster solutions. At each stage, the stems with the smallest Euclidean distance are combined; the coefficients indicating cluster heterogeneity change when a stem is combined with the cluster. The solution before the largest gap in the coefficient indicates the best cluster solution (Stage 22).

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