


Developmental Items of Human Figure Drawing: Dance/Movement Therapy for Adults with Intellectual Disabilities

Silvia Barnet-López¹  · Susana Pérez-Testor¹ ·
Josep Cabedo-Sanromà¹ · Caterina Gozzoli² ·
Guillermo R. Oviedo¹ · Myriam Guerra-Balic¹

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Abstract The purpose of this study was to identify and describe the characteristics of human figure drawing in adults with intellectual disabilities, and to evaluate the developmental items after a 3-month intervention program using dance/movement therapy. The program consisted of 26 sessions lasting 1-h each held twice weekly for 3 months. A group of 30 adults with intellectual disabilities participated. Before and after the program, the Koppitz human figure drawing test was applied to evaluate body knowledge through the developmental items, evaluating elements of the person's cognitive developmental and maturity. After the intervention, results indicated improved body knowledge in the participants and a significant increase in the scores on the developmental items at the end of the program.

Keywords Body knowledge · Dance/movement therapy · Human figure drawing · Intellectual disability

Introduction

Dance/Movement Therapy for Adults with Intellectual Disabilities

According to the fifth edition of the *Diagnostic Statistical Manual of Mental Disorders* (DSM-5) published by the American Psychiatric Association (2013), Intellectual disability (ID) is a disorder that appears during the developmental period of 4–18 years of age. It includes both intellectual and adaptive functioning

✉ Silvia Barnet-López
SilviaBL0@blanquerna.url.edu

¹ SAFE- Research Group, FPCEE- Blanquerna, Universitat Ramon Lull, c/Císter 34, 08022 Barcelona, Spain

² Facoltà di Psicologia, Università Cattolica del Sacro Cuore, Milan, Italy

deficits, as well as in conceptual, social, and practical domains. The following three criteria must be met: (1) deficits in intellectual functioning; (2) deficits in adaptive functioning that result in failure to meet developmental and sociocultural standards for personal independence and social responsibility; (3) onset of intellectual and adaptive deficits during the developmental period 4–18 years of age (Carulla et al., 2011). People with ID have significant limitations in their developmental, intellectual, and adaptive behavior including conceptual, social, and adaptive skills (Schalock, Garder, & Bradley, 2006). In Spain, the national government classifies the percentage of disability (physical, intellectual and/or sensorial) into five degrees: non-existent (0 %); borderline (15–29 %); mild (30–59 %); moderate (60–75 %); severe and profound (>76 %) (Boletín Oficial Del Estado, 1999). The classifications reflect various degrees of capacity to adapt to various every-day environments.

Ritter and Low (1996) performed a meta-analysis that included a number of studies with dance/movement therapy (DMT) interventions with a variety of populations—including some studies with intellectual disability. Results suggested some positive physical and psychological changes through DMT including improvements in daily functioning and enhanced body image (Rogers, 1977; Tipple, 1975). Unfortunately, no studies addressed DMT's effect on either developmental or maturity factors. Further, while some of the studies included in the meta-analysis used projective tests through drawings, the human figure drawing (HFD)—discussed in more detail below—was not widely used (Ritter & Low, 1996). Other authors Koch, Kunz, Lykou, and Cruz (2014), in their meta-analysis, showed that the DMT provides benefits to its participants. However, the only research with persons with ID included in this analysis were two studies on autism (Hartshorn et al., 2001). Literature continues to highlight the lack of evidence-based studies on DMT for intellectual disability.

In the study discussed below, DMT was used as an intervention with people with intellectual disability. The sessions were specifically designed to meet the particular need of each participant, focusing on supporting the participants in developing corporal scheme and corporal expression. This meant that the therapist had to adopt a more managerial style during the sessions, because of the participants' profiles with regard to their physical (motor skills) and psychological limitations. In addition, one of the essential elements of the DMT sessions design was to provide the participants with a clear structure of movements and activities within the sessions. Moreover, it was important to apply appropriate instruments to the participants with ID so as to evaluate the intervention, bearing in mind participants' limitations in both oral and written communication (Paredes, 2010).

Human Figure Drawing

Human figure drawing (Koppitz, 2000) is a projective test where participants are asked to draw a person. Projective tests can be used to quantify developmental and maturity factors, as well as body image. Other methods to evaluate psychophysical measures exist, but not all of them are valid for this population. The HFD is considered a useful instrument for the ID population (Barbosa, 2013).

Human figure drawing is a non-verbal tool through which the subject can express his or her emotions (Maganto & Garaigordobil, 2011). Symbolic graphic

representation allows us to see the relationship between the representation and how the person symbolizes it. It also allows us to delve into a person's cognitive and socio-affective elaboration through the expression of a specific moment or situation experienced by the person (Leal, 2006). Thus, HFD delivers information on current status related to different aspects of the self, including mental development, attitudes, concerns, maturity, and experience. It also offers us the possibility of conducting a re-test and the opportunity to detect the changes that appeared in our subjects after the DMT intervention (Pérez Testor & Pérez Testor, 2000).

Human figure drawing is a widely used technique in children (Koppitz, 2000), although it can also be an appropriate instrument for the evaluation of conceptual maturity among a variety of populations. It also may reveal elements of a person's cognitive development and maturity (Carreras, Uriel, & Liporace, 2013; Goodenough, 1928; Hammer, 2005; Koppitz, 2000; Machover, 1949). Through HFD, participants can express their perceptions of body schema and also reveal information about individual concerns or personality traits (Carreras, Uriel, & Liporace, 2013). The items obtained through the HFD are considered to be developmental items, as they reflect how individuals may change their perceptions of their bodies through time. When administering this kind of test, it is important to take the participants' social context and particular situation into account (Barbosa et al., 1998).

Body integration is related to the evolution, development, and growth of the person. We believe that the construction of body structure—considering it an organization of sensations of one's own body in relation to the external world—plays a crucial role in the subject's development. The body allows us to perceive the external world and interact with it (Raich, 2000; Vayer, 1972). A psychoanalytic perspective describes body knowledge as a mental representation of the body that each person builds. Each person's own body knowledge has to do with the perception of the whole body as well as their perception of the body parts that define it.

Concerning people with ID, there are previous studies that include different interventions and HFD to evaluate their effects, but the characteristics of the samples analyzed were different. Barros and Ison (2002) conducted a comparative study of children with and without behavioral problems. Their results indicated that children with behavioral problems had lower scores on the developmental items, suggesting lower conceptual maturation among these children. Another relevant study by Lym and Slaughter (2008) focused on children with Asperger's syndrome. The authors observed that the drawings by these children expressed a lack of interest in the social world and relational communication. Moreover, there are other recent studies with HFD based on populations with mental health disorders that reveal the characteristics of the drawing samples in each specific population (Barbosa, 2013; Rodríguez, Portillo, Vucínovich, & Serrano, 2011).

HFD usually reflects distortions and omissions that reveal features and/or problematic elements of the individual (De Felipe et al., 2011). Hammer (1958) believes that distorting or omitting parts of the body in HFD suggests that there is a kind of conflict with those parts. He focused especially on hands and arms as body parts directly associated with contact and manipulation. De Felipe et al. (2011) state that omitting the hands is an indicator related to deficits in bonds, relationships, and contact with others.

Human Figure Drawing and Dance

In our own study, we found few scientific contributions in the field of DMT with ID adults. Arús and Pérez (2006) used HFD to demonstrate that a single dance session contributed to improving children's emotional elements. When applying HFD to an adolescent population with Down syndrome, a research team observed that after a single dance session the subjects increased their knowledge of their own bodies (Pérez Testor & Pérez Testor, 2000; Pérez et al., 2009). These benefits were also reported in a study of a group of adults with ID that evaluated one session of DMT using HFD (Barnet, Pérez Testor, & Guerra, 2013). Koppitz (1984) proposed a systematization of developmental aspects (maturation). In her study, she focused on developmental aspects, specifically during childhood. The author distinguished between four categories: (a) expected; (b) common; (c); unusual; and (d) exceptional.

Objectives

The objectives of this study were: (1) to identify and describe the characteristics of HFD in adults with ID; (2) to evaluate the developmental items in HFD (Koppitz, 2000) before and after a series of 26 sessions of DMT intervention in adults with ID; and (3) to evaluate the developmental items in the HFD (Koppitz, 2000) before and after one session with DMT in adults with ID at the beginning and at the end of the intervention.

Method

Subjects

For this study, we recruited an intentioned sample, which was made up of 30 adults with ID, from a workshop for individuals with ID in Girona, Spain. During the project, we eliminated eight subjects because they presented the following exclusion criteria: attending fewer than 75 % of the sessions and/or not having completed the four HFDs.

Finally, the participants included 22 adults with ID—12 men and 10 women with a mean age of 47.3 (SD 11.7 years). All participated in the DMT intervention and each presented a moderate or severe degree of disability according to the national government's classification (Boletín Oficial del Estado, 1999).

All the subjects and their parents and/or legal guardians, as well as the center staff, were fully apprised of the evaluation protocols and the intervention. In addition, the parents and/or legal guardians and participants signed an informed consent agreement. This study obtained the approval of the Institutional Research Board.

Dance/Movement Therapy Intervention

The subjects participated in a DMT program consisting of 1-h sessions held twice a week for a period of 3 months. At the end of the process, all the participants had

Table 1 Description of the DMT intervention program: components and elements of the activities

Components	Main elements of the activities performed in the DMT intervention
Body scheme	Identify and move the different parts of the body Being conscious of the body's movements Mobility and low-intensity exercises
Rhythms	Rhythmic marching Corporal percussion
Self-concept	Positive reinforcement Changing the leader during the activities among the participants of the group.
Relationship	Corporal expression activities in pairs or groups like 'hellfire dance', 'we are statues' or 'we are a tribe'.
Identification of the different types of emotions	Body postures and facial expression Focus on a emotion like happiness or sadness and then perform it
Laban effort	Movements in different directions and on different surfaces Experiencing new movements Music or materials to promote different types of movements
Balance and coordination	Movements in different directions and on different surfaces Single leg static balance and tandem positions
Grounding	Body posture Locating the center of the body Relaxation activities Different exercises for moving in space and connecting with other participants
Free dance	Body expression Free movements in the last part of the session to explore movement itself.

participated in a total of 26 DMT sessions. Each of the sessions had a similar structure based on the work of DMT pioneer, Marian Chace (1953). The content of the sessions is outlined below (see Table 1):

- *Check-in* First, the participants expressed their mood by pointing to one pictogram of their choice. There were three pictograms available that expressed happiness, a neutral mood, or sadness (Schalock et al., 2006). Then, researchers marked the date on a calendar, so that the participants could be aware of how many sessions had already taken place and how many were left.
- *Warm-up* This consisted of several basic body-movement exercises. The aim was to work on the body schema as well as preparing their bodies for the forthcoming movements. The exercises were focused on pointing their body structures as warm-up movements, so they were able to learn about themselves with a routine of repetitive movements.

- *Transition-process* Depending on the particular objectives of the session, the therapist suggested different actions to engage participants in movement like corporal percussion or rhythmic march. In particular, we designed a set of movements that encouraged creativity and bodily expression.
- *Check-out* The participants once more pointed to a pictogram. They could express how they felt at the end of the session by pointing at one of the three pictograms described above. Finally, the session closed as participants engaged in a ritual, which involved using the same music, dancing in a circle, and saying good-bye to each of the participants by individually mentioning their names.

The administration of the HFD test took place before and after the sessions (pre- and post-test). The first three sessions familiarized the participants with the intervention, the staff, and the test. Specifically during session four, drawing one (D1) was made at the beginning of the session and drawing two (D2) at the end of the session.

Drawing one was also considered the program's pre-test. Later, during session 24, drawing three (D3) was made at the beginning of the session and drawing four (D4) at the end of the session. Drawing four was also considered the entire program's post-test. The last two sessions were used to prepare for the intervention's closure, advancing participant awareness of the imminent concluding of the activity was to help avert the potential confound of the participants making their drawings under emotional duress.

Instrument

The HFD Test (Koppitz, 2000) consists of giving each participant a piece of paper (DIN-4 size) and one pencil (HB2). They were then told *to draw a whole person*. The participants had 15 min to draw, and they were not allowed to erase any parts of the drawing.

The developmental items selected were the 30 items in accord with Koppitz's proposal (2000). These HFD's were applied and analyzed by a psychologist and dance/movement therapist. The results were supervised by an HFD test expert.

Data Analysis

The statistics package SPSS.21 (IBM SPSS Statistics, Chicago, IL, USA) was used to conduct all analyses, and descriptive and inference statistical analyses were obtained for all variables. A frequency study of the HFD's developmental items was run in order to show the characteristics of the drawings in this population.

The Kolmogorov–Smirnov test showed that the sample achieved the normal criteria. Paired sample *t* tests were used to compare means of related samples (D1–D4; D1–D2; D3–D4). We achieved a 95 % confidence level throughout the entire study.

Results

The developmental items that always appeared in the drawings before the DMT intervention (*D1*) showed 26 of the total of 30 existing developmental items (see Table 2). The four items that did not appear in any of the drawings (*D1–D2–D3–D4*) were elbows, knees, profile and good proportions.

Focusing on the results of the total intervention (*D1–D4*), we can see that the developmental item *mouth* increased its presence by 31.8 %, followed by *feet* and

Table 2 Percentage of the presence of developmental items in each of the DFHs

Item nos.	Developmental items %	D1	D2	D3	D4
1	Head	86.4	90.9	90.9	95.5
2	Eyes	72.7	86.4	77.3	86.4
3	Pupils	18.2	22.7	18.2	22.7
4	Eyebrows or eyelashes	22.7	18.2	31.8	31.8
5	Nose	63.6	72.7	63.6	72.7
6	Nostrils	4.5	9.1	4.5	9.1
7	Mouth	50	77.3	63.6	81.8
8	Two lips	9.1	18.2	27.3	27.3
9	Ears	27.3	40.9	36.4	40.9
10	Hair	45.5	63.6	59.1	68.2
11	Neck	40.9	36.4	31.8	36.4
12	Body	68.2	81.8	77.3	81.8
13	Arms	68.2	86.4	77.3	86.4
14	Arms in two dimensions	40.2	54.5	45.5	50
15	Arms pointing downwards	22.7	22.7	22.7	27.3
16	Arms correctly attached to shoulders	13.6	9.1	22.7	13.6
17	Elbows	0.0	0.0	0.0	0.0
18	Hands	45.5	45.5	45.5	45.5
19	Finger	50	47.6	50	54.5
20	Correct number of fingers	9.1	13.6	9.1	9.1
21	Legs	72.7	86.4	81.8	90.9
22	Legs in two dimensions	40.9	45.5	40.9	50
23	Knees	0.0	0.0	0.0	0.0
24	Feet	59.1	63.6	68.2	81.8
25	Feet in two dimensions	45.5	50	45.5	50
26	Profile	0.0	0.0	0.0	0.0
27	Clothing (one item or none)	90.1	95.5	95.5	95.5
28	Clothing (two or three items)	13.6	18.2	13.6	18.2
29	Clothing (four or more items)	4.5	4.2	4.5	9.1
30	Good proportions	0.0	0.0	0.0	0.0

D1 pre-test DFH beginning of session 4, *D2* post-test DFH after session 4, *D3* pre-test DFH beginning of session 24, *D4* post-test DFH after session 24

Table 3 Frequency of the increase in the presence of developmental items before and after the DMT intervention

	Developmental items	D1–D4 Intervention	D1–D2 Session 4	D3–D4 Session 24
1	Mouth	31.8	27.3	18.2
2	Hair	22.7	18.1	9.1
3	Feet	22.7	4.5	13.6
4	Two lips	18.2	9.1	0.0
5	Arms	18.2	18.2	9.1
6	Legs	18.2	13.7	9.1
7	Eyes	13.7	13.7	9.1
8	Ears	13.6	13.6	4.5
9	Body	13.6	13.6	4.5
10	Arms in two dimensions	9.8	14.3	4.5
11	Head	9.1	4.5	4.6
12	Eyebrows or eyelashes	9.1	−4.5	0.0
13	Nose	9.1	9.1	9.1
14	Legs in two dimensions	9.1	4.6	9.1
15	Clothing (one item or none)	5.4	5.4	0.0
16	Nostrils	4.6	4.6	4.6
17	Arms pointing downwards	4.6	0.0	4.6
18	Clothing (two or three items)	4.6	4.6	4.6
19	Clothing (four or more items)	4.6	−0.3	4.6
20	Pupils	4.5	4.5	4.5
21	Finger	4.5	−2.4	4.5
22	Feet in two dimensions	4.5	4.5	4.5
23	Elbows	0.0	0.0	0.0
24	Hands	0.0	0.0	0.0
25	Correct number of fingers	0.0	4.5	0.0
26	Knees	0.0	0.0	0.0
27	Profile	0.0	0.0	0.0
28	Good proportions	0.0	0.0	0.0
29	Arms correctly attached to shoulders	0.0	−4.5	−9.1
30	Neck	−4.5	−4.5	4.6

Table 4 Descriptive analysis of the four HFDs done by participants

	N	Minimum	Maximum	Mean	SD
D1 Developmental	22	0	21	10.9	6.4
D2 Developmental	22	2	22	12.6	5.5
D3 Developmental	22	3	21	12.0	6.2
D4 Developmental	22	3	22	13.3	5.7

Table 5 Differences between the results at the beginning and the end of session, and the results between the beginning and the end of the intervention

Pairs	\bar{X}/S	p
D1–D4	10.9 ± 6.4 vs. 13.3 ± 5.7	0.001**
D1–D2	10.9 ± 6.4 vs. 12.6 ± 5.5	0.006**
D3–D4	12.0 ± 6.2 vs. 13.3 ± 5.7	0.012*

* $p < 0.05$; ** $p < 0.01$

hair. These latter two increased their presence by 22.7 %, and two *lips*, *arms* and *legs* increased their presence by 18.2 %.

Whereas there is an increase in the frequency of 22 items after the intervention, there is only one item that decreased after the DMT intervention—the neck by 4.5 %. Seven items did not change after the DMT intervention—elbows, hands, correct number of fingers, knees, profile, and good proportions.

Regarding session four (the beginning of the intervention), there is an increase in 19 developmental items after just a single session of DMT (D1–D2) and a decrease in five of them—eyebrows or eyelashes, clothing (four or more items), fingers, arms correctly attached to shoulders and neck. Likewise, there are six items that did not change—arms pointing downwards, elbows, hands, knees, profile, and good proportions (see Table 3).

Regarding session 24 (the end of the intervention), there was an increase in 20 of the developmental items and a decrease in one of the items (arms correctly attached to shoulders). Nine items maintained their presence: two lips, eyebrows or eyelashes, clothing (one item or none), elbows, hands, correct number of finger, knees, profile and good proportions (see Table 3).

Table 4 shows the mean, standard deviation, minimum and maximum of the results of the four drawings. There was an increase in the mean average (10.9 vs. 13.3) between the beginning and the end of the intervention (D1–D4) and a decrease in the standard deviation (6.4 vs. 5.7). Before and after session four (D1–D2), the average of the mean increased from 10.9 to 12.6, whereas in session 24 (D3–D4) the average of the mean increased from 12.0 to 13.3 (see Table 4).

We observed significant differences between variables in the total intervention, D1 and D4 ($p = 0.001$). Significant differences were also observed between the variables related to a single session, D1 and D2 ($p = 0.006$), which came at the beginning of the intervention; and D3 and D4 ($p = 0.012$), which came at the end of the intervention (see Table 5). These results show that the values of D4 items were significantly higher than the values of D1 and D3, and those from D2 were significantly higher than D1.

Discussion

This article presents the results of a DMT intervention during 26 sessions in adults with ID, which has been evaluated through the HFD developmental items proposed by Koppitz (2000). With HFD, subjects can express their perceptions of their bodies

and we can detect the knowledge that they have of their own bodies (Carreras, Uriel, & Liporace, 2013; Goodenough, 1928; Koppitz, 1984).

In this study, we have applied the evaluation system proposed by Koppitz (2000), one of the greatest leaders in HFD, as a means of examining our sample's cognitive disabilities. HFD enables identification of these cognitive and developmental disabilities, and allows us to observe whether there is an increase in the developmental items after the DMT intervention.

First, we described the sample characteristics of the drawings following Barbosa's (2013) protocol. The items identified as relevant in the drawings of the sample corresponding to D1 (at the beginning of the intervention) were present in more than 50 % of the drawings, as Koppitz (1984) proposed when referring to the expected and common items (see Table 2).

People with ID have limitations on their developmental, intellectual, and adaptive behaviors (Schalock et al., 2006), as well as on their communication patterns (Paredes, 2010). Results of this study support the hypothesis that a therapy program such as DMT, where body expression plays an important role, may promote participant contact with and a better understanding of their own body. Dance/movement therapy also allows us to explore a way to communicate through nonverbal expression and movement.

Human figure drawing has previously been applied with people with ID (Barbosa, 2013; Rodríguez et al., 2011); however, as far as we know, these studies have only been conducted with children and adolescents (De Felipe et al., 2011; Lym & Slaughter, 2008). Some of these studies have assessed just a single session of DMT, but the effects of an entire DMT intervention program have not been studied (Arús & Pérez, 2006; Barnett et al., 2013; Pérez Testor & Pérez Testor, 2000; Pérez et al., 2009).

In our study, the drawings' most characteristic developmental items appeared before the DMT intervention (D1) (see Table 2). They were: clothing (one item or none) (90.1 %), head (86.4 %), eyes and legs (72.7 %), body and arms (63.6 %), nose (63.6 %) and feet (59.1 %). These items matched those described by Koppitz (2000) for the developmental age of 5 years: head, eyes, nose, mouth, body, and legs. Although the percentage is below the 85 % proposed by Koppitz (2000), we consider our sample to be below the 5-year-old mark of developmental maturity.

According to Koppitz (2000), the head is considered the first item to be drawn, followed by eyes, legs and body and arms. Accordingly, the items that appear in our drawings (D1) coincide with this most basic level of maturational development.

In our case, the clothing item stands in the first place (90.1 %), even if it is not considered a basic item of developmental maturity. This result was expected because of cultural considerations, as it is uncommon for people to draw the body naked in HFD in our culture (Cid & Urbano, 2006). The feet item (59.1 %) is related to displacement and to approaching objects and the environment, and is also linked to body stability and balance (Cid & Urbano, 2006).

In addition, we observed that 22 of the 30 developmental items increased their presence after the DMT intervention (D1–D4) (see Table 3). We noted that the mouth is the item that increased the most after the intervention (D1–D4), with a 31.8 % increase. The mouth is related to several basic human needs such as eating,

and it is also related to expression and communication (Cid & Urbano, 2006). The drawings also showed an increase in such other items as hair and fingers (22.7 %), two lips, arms and legs (18.2 %), eyes (13.7 %), ears and body (13.6 %). The increased presence of these items indicates a possible augmentation in maturity development (Koppitz, 2000).

Only one of the items decreased its presence in D4 (at the end of the intervention): the neck (4.5 %). This item is usually omitted in people with ID and in aggressive subjects. Its omission is related to immaturity, impulsiveness and poor internal control (Barbosa et al., 1998). Although these last elements are related to the emotional indicators proposed by Koppitz (2000), we did not study them.

Some of the developmental items were omitted in the sample's drawings (D1–D2–D3–D4), including elbow, knee, profile and good proportions. Omissions of body parts are variously interpreted as signs of possible concern (Hammer, 2005) or as indicators of a low maturity development (Koppitz, 2000). Because of the characteristics of the sample, we believe that the omissions of the elbows and the knees, as well as the lack of good proportions in the figures, are due to our sample's cognitive disabilities and maturity difficulties. The fact that all the figures were drawn from the front and that the profile did not appear may be linked to an outgoing attitude with people, communication and interpersonal relationships (Barbosa, 2013).

Statistical analysis for related samples shows significant differences after a single session of DMT: D1–D2 ($p = 0.006$) and D3–D4 ($p = 0.012$). Therefore, a single dance session increased the presence of developmental items (see Table 5) and provided greater body knowledge, in concurrence with the results of previous studies (Pérez et al., 2009). In addition, a significant difference between D1 and D4 ($p = 0.001$) (see Table 5) was observed; the DMT intervention promoted an increased presence of developmental items, along with subjects' maturation and cognitive development (Koppitz, 2000). The DMT intervention also promoted increased body knowledge in the sample (Goodenough, 1928). We can state, therefore, that the DMT intervention improved our sample's body knowledge.

Limitations and Recommendations for Further Research

The limitations of this study should be noted. The size of the sample is small, such that the results should be considered a tendency in development that cannot be generalized to the entire population of adults with intellectual disability. Another limitation was not having a control group with physical, cognitive and activity characteristics matching the DMT group. A control group would have shown whether the improvements appeared because of the DMT intervention, so more research is needed.

Another limitation was the application of only one instrument to evaluate the intervention. The instrument chosen, HFD, showed the changes possibly influenced by the intervention. However, past studies have used projective tests combined with other instruments, such as verbal scales, which would complement the information from the HFD (Bojner Horwitz, Kowalski, Theorell, & Anderberg, 2006). Therefore, we believe that it would be worthwhile to perform further studies, adding one or more instruments in order to augment the information from the HFD.

This new assessment tool should reflect this population's cognitive and expressive limitations. Projective instruments might well be considered.

For future studies, it would be interesting to assess different comorbidities and motor impairments, such as hemiplegia or cerebral palsy, which might influence and condition subjects' body schema, and in turn, their drawings. In this case, participants would have to pass a physical screening prior to the study, and other inclusion criteria would also have to be considered. The relationship between the degree of disability and the development level could also be studied with a bigger sample by comparing between varying levels of disability (mild, moderate and severe ID), as these may influence performance and body knowledge.

Another important aspect for future consideration is analysis of the effects of a DMT intervention on participants' emotional expression. A focus on factors related to individual emotional wellbeing, using Koppitz's emotional indicators (1984), might be of interest. Two of these possible items could be the neck and the feet, which are related to body stability.

Conclusions

The HFD items that have been identified and considered relevant (over 50 %) in a sample of adults with ID before the intervention (D1) are: clothing, one item or none (90.1 %), head (86.4 %), eyes and legs (72.7 %), body and arms (68.2 %), nose (63.6 %) and feet (59.1 %) (see Table 2).

Regarding the results after the DMT intervention, we can state that the HFD items that were identified and considered relevant (over 50 %) in a sample of adults with ID are (D4): clothing, one item or none, and head (95.5 %), legs (90.9 %) eyes and arms (86.4 %), mouth, body and feet (81.8 %), nose (72.2 %), hair (68.2 %) and finger (54.4 %). The developmental items proposed by Koppitz (2000) that did not appear in any of the four drawings (D1–D2–D3–D4) of the sample were elbows, knees, profile and good proportions (see Table 2).

We observed that some items increased with the DMT intervention, such as mouth (31.8 %), and feet and hair (22.7 %) (see Table 3). The increase in the presence of the mouth and feet items may be related to the improvement in expression or/and communication of the person with the environment, and the stability and balance of the body.

In this study, the DMT intervention led to significant changes between D1 and D4 ($p = 0.001$) (see Table 5). Therefore, as the intervention increased the developmental items, we can suggest that the current DMT intervention improved knowledge of the body in the adults with ID in the sample. Unfortunately, we cannot generalize these results as the study was done without a randomized control group.

The changes that appeared in D2 compared to D1 in session 4 (D1–D2) and the changes that occurred in D4 compared to D3 in session 24 (D3–D4) of the intervention are also significant ($p = 0.006$ vs. $p = 0.012$). There was an increase of the presence of developmental items after each session separately. Taking this into consideration, it may be suggested that even a single DMT session may increase the knowledge of the

body in adults with intellectual disability. More research is needed to confirm these findings, specifically by comparing them to those of a control group.

In closing, based on this study's conclusions, a DMT program could be used as a tool to increase knowledge of the body among adults with ID. According to recent embodiment research, knowing one's own body better may affect the development of affection and cognition and lead to better understanding of emotions (Gibbs 2005; Koch et al., 2014; Lakoff & Johnson, 1999). Therefore, the HFD may be a useful tool in the study of body awareness among persons with ID and specifically how engaging in embodied interventions such as DMT, may advance development of this body knowledge in this population.

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Silvia Barnet-López

has a Masters in Dance/Movement Therapy (Autònoma University of Barcelona) and Masters in Health Psychology (University Ramon Llull). At present, she is a PhD Student in Psychology, member of the consolidated Research Group on Health, Physical Activity, and Sport at the Faculty of Psychology, Education and Sport Sciences - Blanquerna, University Ramon Llull. Her thesis project is focused on the benefits of dance/movement therapy for people with intellectual disabilities. She has participated in national and international congresses.

Susana Pérez-Testor

has a Masters in Psychology Research and a PhD in Psychology. She is a member of the consolidated Research Group on Health, Physical Activity and Sport at the Faculty of Psychology, Education and Sport Sciences - Blanquerna, University Ramon Llull. She has training in projective testing, including the Human Figure Drawing Test. Since 1994 she developed the Danza Esquema Corporal (DEC) project

aimed at studying the benefits of dance performance evaluated through the Human Figure Drawing Test. Ten phases of this project were developed with dance students from 4 to 22 years of age, and persons with Down syndrome. The results have been presented at dance conferences and published in dance journals.

Josep Cabedo-Sanromà

is a full professor of Motor Learning of the Department of Physical Activity and Sport Sciences. Member of the consolidated Research Group on Health, Physical Activity and Sport at the Faculty of Psychology, Education and Sport Sciences - Blanquerna, University Ramon Llull. Has a PhD in Motor Development with research expertise in balance across life span, technical and tactical sport, and aging.

Caterina Gozzoli

has a PhD in Psychology and is an Associate Professor at the Psychology Department of the Catholic University of Sacred Heart in Milan, Italy. She is the Director of the Executive Masters' Degree in Sport and psychosocial intervention and Director of ASAG (Alta Scuola Agostino Gemelli), of the Catholic University of the Sacred Heart (Milan). Caterina's main area of investigation is Management by diversity and Sport Psychology with particular attention given to sport as a tool for social integration and to young sport sectors of professional teams. Other research interests are professional identity of coaches and sport psychologists and training processes.

Guillermo R. Oviedo

has a Masters degree in Sports Medicine from the University of Tucuman, Argentine and a Masters in Sport and Psychosocial Intervention from the Catholic University of the Sacred Heart in Milan, Italy. Also has a PhD in Exercise and Sport Science from University Ramon Llull, Barcelona, Spain. Participant as a researcher in different health projects including the effects of different types of exercise intervention for people with Intellectual Disability, Multiple Sclerosis, breast cancer and the elderly. Currently he is a Post-Doctoral researcher at the North-West University, South Africa.

Myriam Guerra-Balic

is a medical doctor specializing in Sports Medicine. Myriam has a PhD in Sports Medicine and is a full professor of Exercise Physiology and head of the Department of Physical Activity and Sport Sciences. Myriam is the principal investigator of the consolidated Research Group on Health, Physical Activity and Sport at the FPCEE- Blanquerna (University Ramon Llull) and has research expertise in exercise physiology, aging and Intellectual Disabilities.