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HYPNOTIC SUSCEPTIBILITY IN CHILDREN WITH DOWN'S SYNDROME

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Abstract

Numerous studies on people with Down's syndrome show that they are able to adapt to simple tasks, have a better ability for language comprehension than for language production, and that their learning difficulties are connected to their particular memory functions as well as to their prolonged information processing time. These characteristics do not, however, highlight elements that suggest non-receptivity to hypnosis. The present research studied (a) hypnotic response in children with Down's syndrome, and (b) the cognitive variables that can mediate the hypnotic response. The sample included twelve participants, 7 girls and 5 boys, ages ranging from 6 to 17, mean age: 10.4 (SD: 3.83). We used the Stanford Hypnotic Scale for Children, Modified Form (SHCS; Morgan and Hilgard, 1979), and also checked Mnemonic recuperation, Abstraction, Perception and Vocabulary comprehension (using different subscales in WPPSI-R, K-ABC and Chevrié Muller, Simon & Decante, 1975). Results show that the children were capable of responding to suggestions under hypnosis; both motor and cognitive. The differences with the pattern of children from the general population are discussed.

Key words: children, Down's syndrome, hypnotic susceptibility

Introduction

According to referenced theoretical models, hypnosis might be considered as a state of focused concentration, or as a radical change of the content of consciousness, associated with involuntary responses pertaining to cognitive, sensory or motor skills. These models raise the question of a conscious or unconscious construction of the mechanisms that control the ideodynamic response (Barber, 1972; Sarbin and Coe, 1972; Hilgard, 1977). Despite their differences, the authors do agree that mental imagery is involved in both the hypnotic response (Spanos, Kennedy and Gwun, 1984; Gwynn, 1990; Gay, 2004) and therapeutic results (Gay, Philippot and Luminet, 2002; Gay, Hanin and Luminet, 2008). Hypnotizability[1] is a widespread competence, often tested in adults. In contrast, very little research pertains to hypnotizability in children. This is probably due to a negative view often expressed about hypnosis. However, several assessment tools have been developed (Cooper and London, 1979; Morgan and Hilgard, 1979) presenting stable results. Hypnotizability in children under the mental age of 7 remains controversial but in children between the ages of 7 and 14 susceptibility peaks between 8 and 12 and declines slightly thereafter. Correlates of hypnotic ability in children may parallel those

reported for adults; hypnotizability significantly overlaps measures of fantasy play, absorption and imagery vividness studied in adults (Plotnick, Payne and O'Grady, 1991). There is no relationship between hypnotizability and intellectual ability. However, the age pattern mentioned above indicates that hypnotisability follows a mental development pattern as well.

Poulsen and Matthews (2003) studied a sample of 44 children with diverse psychopathological disorders (bipolar, depression, post traumatic stress). These children had the same response pattern as children without pathological disorders. These results indicate that hypnotic susceptibility is not altered by personality disorders. The study joins and reinforces other studies that find no correlation between personality traits and hypnotic response. We have not found any data concerning handicapped children. As far as we know no research on the subject has been published even though research concerning this population could allow one to learn more about the existing cognitive structures that allow the appearance of involuntary responses.

We chose to study children with Down's syndrome. We chose this population because of the particular cognitive characteristics of these children. Our research is therefore exploratory with fundamental research preoccupations. Children with Down's syndrome have specific psychological characteristics which had been attributed to delayed development (Mans, Cicchetti et Sroufe, 1978), or a specific delay in development at certain moments and normal development at others (heterogeneous development; see Kopp, 1983; Morss, 1983). Current research has not been comparative but rather concerns the development of handicapped children depending on their specific handicap or the deficits caused by it. We have studied the different psychological functions (social, affective, linguistic, etc.) in order to construct these children's clinical characteristics that would facilitate their subsequent education and/or pedagogy.

Down's syndrome is characterized by the ability to adapt to simple tasks, have a better ability for language comprehension than for language production (Miller,1992; Fabbretti,

Pizzuto, Vicari and Volterra,1997; Chapman, 1997), and by learning difficulties connected to particular memory functions as well as to prolonged information processing time (e.g. Miranda and Frantz,1973; Straford, 1979; Marcell and Armstrong, 1982; Mac Turk, Vietze, Mac Carthy, Mac Quiston and Yarrow, 1985; Pueschel, Gallagher, Zartler and Pezzullo, 1987; Pozzan, 1990; Pinter, Eliez and Schmitt, 2001; Laws, 2002). This population's cognitive characteristics do not, however, highlight elements that suggest non-receptivity to hypnosis. The opposite is true. They imply use of a preferentially visual encoding of information, a fact that would support clinical observations as well as favour this population's capacity for hypnosis.

Iglesia, Buceta and Campos (2005) conducted a study on the use of strategies based on visual and mental images in order to improve memory recall of children with Down's syndrome. This study confirmed the ability to activate image representations and suggested the possibility of using this ability to improve learning. The study showed that children with Down's syndrome always obtained significantly lower scores than children from the general population for memory tasks. They obtained higher scores when a drawing or mental image is used for recall than when confronted with verbal information. Accordingly we hypothesize that children with Down's syndrome should be hypnotizable. That their scores would correspond to those of younger children without Down's syndrome is due to the fact that their hypnotic susceptibility follows a slower development curve.

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This article aims 1) to check whether children with Down's syndrome are able to be hypnotized, and 2) to examine the cognitive conditions needed for, and used during the hypnotic response by these children.

Method

Participants

The participants included fifteen children between the ages of 6 and 17, with Down's syndrome, all students of a school specializing in mental retardation. Two children were excluded from the study because they had poor language skills, and one dropped out after the first interview. The final sample included twelve participants, 7 girls and 5 boys, ages ranging from 6 to 17, mean age: 10.4 (SD: 3.83). The children in this study did not have mosaicism or Robertsonian translocation that occur in only about 4% of the cases.

Measures

Hypnotic susceptibility

We used the Stanford Hypnotic Scale for Children, Modified Form (SHCS; Morgan and Hilgard, 1979). The norms for this tool were based on testing children aged 3 to 16 from the general population. The scale shows good psychometric properties (Morgan and Hilgard, 1979; LeBaron, Zeltzer and Fanurik, 1988). We chose the SHCS chiefly because it is a widely used and accepted measure of children's hypnotic susceptibility and because there is a modified form (the SHCS: M), which was initially aimed at young children between the ages of 4 and 8, and is therefore adapted to our population of children with Down's syndrome who do not like to relax, nor to keep their eyes closed. We also chose it because it is designed for clinical use and requires no more than 20 minutes to administer. The modified form does not entail the conventional relaxation/eye closure induction but rather an imagination induction in which suggestions are provided to incite the child's imagination/fantasy. The experimenter simply suggested that it might be easier with eyes closed.

The SHSC: M was translated into French by a bilingual person (American-English-French) that had studied psychology in both the USA and in France. The SHSC: M is currently being validated for a population of French children.

We administered the scale individually, which required about 20 minutes with each participant. The following items were presented through imagination instructions: hand lowering, arm rigidity and both visual and auditory TV hallucinations, dream, and age regression. The child received a score of 1 (pass) or 0 (fail) for each item. Hypnotic susceptibility is operationally defined as: the frequency in which a subject acts as a hypnotized person when the responses are elicited by the standardized procedure. We usually used the terms 'hypnotic responsiveness', 'hypnotic responding' or 'hypnotizability' to indicate the rating of a child's response to hypnotic susceptibility. We used a critical score of 4 to distinguish high and low ability levels (Morgan and Hilgard, 1979; Wall and Womack, 1989).

We decided not to evaluate the children's mental age. We only took their chronological age into consideration like other researchers in the field (Buckley, 1993, 1995; Broadley, MacDonald and Buckley, 1994; Byrne, Buckley, Mac Donald and Bird, 1995; Landry and Chapiesky, 1989). Indeed works on deficient populations put forward the use of heterogeneous assessment tools. There is an absence of validation for these populations,

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which are mostly not assessed separately despite the diversity of their mental deficiencies (for a review, see Frenkel, Lagneau and Vandromme, 2005).

Age patterns show that hypnotizability is related to a mental development pattern. We chose four subtests from different tools, adapted to our purpose and easy to apply with these children. The four dimensions assessed were vocabulary comprehension, perception, mnemonic recuperation and abstraction:

- Mnemonic recuperation ('Animal pegs' in the WPPSI-R; Wechler, 1995) This subtest is optional when giving the test and is called 'Animal house' in the WPPSI. It is also used in IQ performance assessment. The task involves giving each animal a colour presented according to a predetermined coding system; a symbolic activity that requires abstraction abilities. The subtest includes 28 coloured pegs. The child needs to place a coloured peg in each hole depending on the animal that has been presented. The maximum score is 75 points including both the number of mistakes and the number of omissions.
- Abstraction (picture completion in the WPPSI-R; Wechler, 1995): this subtest is also used in IQ performance assessments and is also based on the child's ability to 'fill in the blanks'. This subtest has 28 drawings on cards. The child compares the drawn object with his/her mental image of the object in memory. The child then names the missing part. One point is given for each correct naming of the object, giving a total of 28 points.
- Perception (Gestalt closure from the K-ABC; Kaufman and Kaufman, 1983): this subtest has 25 items and also measures the child's ability to 'mentally fill in the blanks' of an incomplete picture in order to name or describe it. This subtest resembles Street's Gestalt completion Test (1931, in Kaufman and Kaufman, 1983) and is based on the closure concept in the Gestalt theory. According to the authors of the test, this subtest often depends on the flexibility of one's perception and thought as well as on a good awareness of one's environment. If the child recognizes the shapes and names them as expected, one point is provided giving a maximum score of 25 points.
- Vocabulary comprehension (Object or animal naming by Chevrié-Muller, Simon and Decante, 1975): this subtest evaluates lexical comprehension. It is based on a test that evaluates different linguistic aptitudes in a population of French children. In this subtest the children have to point at images presented by the experimenter.

Procedure

The teachers from the specialist school contacted the parents previously informed about the study. Fifteen parents agreed to participate. After they had given their initial approval, we made two appointments at the child's home. We chose to intervene at the children's homes because it is a familiar environment that could facilitate relaxation and encourage attention.

The children sat at the table to complete the tests and in an armchair, sofa or chair (as they preferred) to answer the hypnotizability scale. During the first session the child gave verbal consent and if he/she agreed, the parents signed an informed-consent form (Caverni, 2000). Then, the child completed the subtests of the different tests (mnemonic recuperation, abstraction, perception, vocabulary comprehension). During the second session, the experimenters administered the SHSC: M. An average of 16 days lapsed between the two appointments.

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The experimenters were two psychology students who had undergone training in the laboratory and who followed guidelines detailing the interventions. For the hypnotic suggestibility scale, the experimenters were asked to formulate simple sentences due to the difficulty children with Down's syndrome have understanding complex sentences (as mentioned earlier). No particular adjustments were made to the cognitive tasks administration.

Results

The present research studied (a) hypnotic response in children with Down's syndrome, and (b) the cognitive variables (vocabulary comprehension, perception, mnemonic recuperation and abstraction) that can mediate the hypnotic response. All the data analysis was computed using the statistical software SPSS 14 for Windows. Table 1 presents the scores obtained per child and per item with the SHSC:M. There was no significant difference between genders ($t(12) = -0.662$; $p = 0.52$, n.s.). Scores range between 0 and 5 with only the 15.4-year-old who contrary to the other children in the study, did not respond to any of the items ($m = 3.33$; $SD = 1.43$.).

We noted that:

- 7 out of the 13 children were able to execute the motor items (hand lowering and arm rigidity) as well as the cognitive ones (TV visual hallucination, TV auditory hallucination, dream and age regression), regardless of their age.
- No order effect was found; the scores did not correspond to the item order, which can often increase in difficulty. Thus 3 children were not successful in the motor task items but were successful in certain cognitive items (children aged 6.7, 7.7 and 17.8 years old).
- The children were likely to fail at least two consecutive items and then carry out the rest successfully. This was the case for 4 children aged 6.7, 7.7, 12.8 and 17.8.

The scores for hypnotic susceptibility were correlated with chronological age: $r = 0.67$; $p = 0.017$. They were also correlated with the previously mentioned cognitive factors (mnemonic recuperation, abstraction, perception, vocabulary comprehension). As for the

Table 1. Children's mean scores for the SHSC: M

Chronological age in years*	Children with Down's syndrome	Children from the general population	
		Individual mean scores	Mean scores
5–6	3 (n = 11)	1 – 1 (n = 2)	1
7–8	5 (n = 20)	3 – 4 (n = 2)	3.5
9–10	5 (n = 15)	2 – 3 – 5 (n = 3)	3.3
11–12	5 (n = 17)	4 – 3 (n = 2)	3.5
13–14	4 (n = 15)	5 – 0 (n = 2)	2.5

* We didn't give the scores for the two boys over the age of 14 due to a lack of information about adolescents older than 14.

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Table 2. Predicting factors of the hypnotic response

	Bêta	*T*
Age	0.21	1.10; n.s.
Perception	−0.41	−1.81; n.s.
Vocabulary comprehension	−0.22	−1.16; n.s.
Abstraction	0.09	0.36; n.s.
Mnemonic recuperation	1.20	4.08**; $p = 0.01$

second aim of this study, the 'cognitive variables' engaged in the hypnotic response in children with Down's syndrome, there was a very strong correlation between hypnotic response and mnemonic recuperation (animal pegs – WPPSI-R): r = 0.93; p < 0.000, with abstraction (picture completion – WPPSI-R): r = 0.82; p = 0.001, with perception (gestalt closure – K-ABC) : r = 0.66; p = 0.019 and with vocabulary comprehension (object and animal naming – Chevrié-Muller et al., 1975): r = 0.62; p = 0.032.

In addition to this procedure, we have also regressed the independent variables (cognitive variables) on the dependent variable (hypnotic susceptibility). Results showed that the model explains 82% of the variance (r = 0.96; p = 0.01) and that mnemonic recuperation assessed with image completion in the WPPSI-R was the most determining factors in the hypnotic response.

Discussion

The present study investigated (a) the hypnotic response in children with Down's syndrome, (b) the cognitive variables (mnemonic recuperation, abstraction abilities, perception abilities and vocabulary comprehension) that can mediate the hypnotic response.

As for our first objective the results show that seven out of thirteen children with Down's syndrome obtain scores equal to, or higher than 4 (out of 6). The children were capable to respond to suggestion under hypnosis; both motor and cognitive suggestions. The pattern for children with Down's syndrome follows the one obtained for children from the general population, the only difference being lower average scores for the children with Down's syndrome. This difference in scores might be explained either by a presumption that these children have generally lower abilities than the children from the general population, or by responses that are out of step with development patterns. At this time we cannot answer this question. Further research should be able to answer it, comparing respective responses of children and adolescents from the general population with those of children and adolescents with Down's syndrome all the way up to adulthood. However, even if these children are less receptive to hypnosis than children from the general population, it should not stop them from being hypnotizable. Even if higher receptivity to hypnosis leads to better therapeutic results, one does not have to be highly hypnotizable to benefit from hypnosis.

Furthermore, the results show a correlation between age and the hypnotic response; the older the participants the more responsive they are. These results reinforce those obtained in studies with children from the general population. They might be explained by a rise in concentration and absorption abilities with growing age. The children might attain a better understanding of instructions and of language in general, a range of representations susceptible to being widely activated, as well as a greater ease in 'letting

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themselves go' in the presence of an unfamiliar observer. These factors, even though not related to IQ, follow children's (with or without Down's syndrome) developmental patterns. More precise research of the general population group is necessary to study these developmental factors.

The second hypothesis tested four cognitive variables. The results show that there is a positive correlation between the four variables and participants' age. This might be explained by the fact that the chosen items are from intellectual and verbal ability assessment tests and that the gross scores obtained for these items were used for calculating the correlation. Given the fact that these items are developmental ones, the older the children, the higher their scores. A positive correlation between the four variables attests to their external validity with the IQ assessment subtests.

Of the four cognitive variables, mnemonic recuperation accounts for 86% of the variance alone. We have previously seen that children with Down's syndrome have a lower IQ than children of the same chronological age and that they develop cognitive skills during their childhood in a non-anarchical pattern (atypical asynchronies). Their visual perception is better than other senses and they feel relatively comfortable with concrete vocabulary. The items on the SHSC: M are therefore accessible to children with Down's syndrome because they entail concrete and rudimentary mental images that the children can access in memory despite their difficulties. They can, for example, use an internally voiced concrete vocabulary ('the branch is strong', 'it is hard', 'it can't break', etc. for the 'hand lowering' item) and refer to a known universe that allows them to access representations solicited by the scale (imagine watching and hearing the television, dreaming…). Independent of age, on this scale the children use long term encoded mental images that they access relatively easily for each of the items. The WPPSI-R's subtest 'image completion' is a predictor of success in the SHSC: M. This suggests that if the children are able to evoke an image using clues (for example, find that a drawn bear is missing an arm), they are equally capable of evoking an image without the use of clues.

The results obtained in this study must, however, be put into perspective first because of the small sample size and second, because of the hypnotic susceptibility measure. As we have previously mentioned, information about the psychometric characteristics of the SHSC:M must be specified and an adapted version for French-speaking children is necessary to continue with this line of research. The idea of expanding this research seems promising. Having access to a larger sample will allow for a deeper exploration of the hypnotic susceptibility of children with Down's syndrome. Despite the study's weaknesses, the results warrant a follow up study on a larger population. This would allow construction of a hypnotic susceptibility scale for both children with and without Down's syndrome. The scale would verify if the susceptibility curve of children with Down's syndrome follows the susceptibility curve of children without (with susceptibility peaking between the ages of 8 and 12 according to Morgan and Hilgard, 1979). It would also help gain a better understanding of the relationship between hypnotic susceptibility and cognitive processes. Future research should focus on the memory formation and retrieval processes involved in the cognitive tasks, particularly the ones involved in the image completion task where one must find the missing part of a drawing. It should also include a consistent investigation of the cognitive processes (assessed for example in the K-ABC; Frenkel et al., 2005) in order to establish relations with hypnotic susceptibility.

The spin-offs from this type of study would be important for fundamental research but even more so for people with Down's syndrome who undergo, as we have mentioned previously, invasive treatment due to the handicapping consequences of Down's

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syndrome. These initial results attained for this population might have a practical application in health care, allowing medical staff the possibility and choice of using this technique when treating patients with Down's syndrome.

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Note

1 We use the terms 'hypnotizability' or 'hypnotisable' to describe the ability to involuntarily respond to hypnosis, following hypnotic induction.

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