

Prosocial and creative play: Effects of a programme on the verbal and nonverbal intelligence of children aged 10–11 years

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The objective of this research was to design a prosocial and creative play programme, in order to assess its effects on intellectual development. The study used a pretest–intervention–posttest design with control group. The sample was made up of 86 participants aged 10–11 years from two schools in the Basque Country, northern Spain. From the complete sample, 54 participants were assigned at random to the experimental condition, while 32 were assigned to the control condition. With the aim of assessing the effect of the programme, before and after its implementation, in the pretest phase and the posttest phase, two assessment instruments were administered to measure the dependent variables, that is, verbal intelligence, nonverbal intelligence, and verbal associative thinking related to verbal creativity. Subsequently, the experimental participants took part in the psychological intervention programme, which consisted of a weekly 2-hour play session throughout the academic year. The session was structured with a sequence of two or three recreational activities and their subsequent debates. The games included in the programme stimulate communication, cohesion, confidence, and the development of creativity; underlying all of them is the idea of acceptance, cooperation, and sharing, while playing and inventing together. The games constituting this programme have five structural characteristics: participation, communication, cooperation, fiction-creation, and fun. Results of the analysis of variance suggest significant impact of the programme on verbal intelligence, on the ability to form concepts or define words, and on the capacity for verbal associative thinking. Also confirmed was a greater effect of the intervention on participants who showed low intelligence levels in the pretest, but no differences were found according to sex. The results indicate a positive effect of interventions that stimulate prosocial play and behaviour on intellectual factors.

L'objectif de cette recherche était de développer un programme de jeu prosocial et créatif et d'évaluer ses effets sur le développement intellectuel. L'étude a utilisé un design prétest–intervention–posttest avec un groupe contrôle. L'échantillon était composé de 86 participants âgés de 10–11 ans, issus de deux écoles du Pays Basque, au Nord de l'Espagne. Parmi les participants, 54 furent sélectionnés aléatoirement pour composer le groupe expérimental, tandis que 32 furent assignés au groupe contrôle. Afin d'évaluer l'effet du programme, deux instruments d'évaluation furent utilisés en phase prétest et posttest pour mesurer les variables dépendantes incluant l'intelligence verbale, l'intelligence non verbale et la pensée associative verbale reliée à la créativité verbale. Les participants du groupe expérimental ont pris part au programme d'intervention psychologique, lequel consistait en des sessions hebdomadaires de 2 heures de jeu, tout au cours de l'année académique. Chaque session était structurée en une séquence de deux ou trois activités récréatives, suivies de discussions. Les parties incluses dans le programme stimulaient la communication, la cohésion, la confiance et le développement de la créativité. Sous-jacent à ces dimensions, nous retrouvions l'acceptation, la coopération et le partage alors que les participants jouaient et inventaient ensemble. Les parties constituant ce programme avaient cinq caractéristiques structurelles: la participation, la communication, la coopération, la fiction-crédation et le plaisir. Les résultats des analyses de variance suggèrent un impact significatif du programme sur l'intelligence verbale, sur l'habileté à former des concepts ou à définir des mots et sur la pensée verbale associative. Les résultats ont également permis de confirmer un plus grand effet de l'intervention sur les participants ayant initialement des niveaux d'intelligence

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inférieurs. Cependant, aucune différence ne fut trouvée en fonction du sexe. Les résultats indiquent un effet positif des interventions qui stimulent le jeu et le comportement prosociaux sur les facteurs intellectuels.

Esta investigación tuvo por objetivo diseñar un programa de juego prosocial y creativo, para evaluar sus efectos en el desarrollo intelectual. Se utilizó un diseño preprueba–intervención–posprueba con grupo de control. La muestra está constituida por 86 sujetos de 10–11 años, pertenecientes a 2 centros escolares del País Vasco en el norte de España. Del conjunto de la muestra 54 sujetos fueron asignados aleatoriamente a la condición experimental mientras que 32 desempeñaron la condición de control. Con la finalidad de evaluar el efecto del programa, antes y después de implementarlo, en la fase preprueba y posprueba, se administraron 2 instrumentos de evaluación para medir las variables dependientes, es decir, la inteligencia verbal, la inteligencia no verbal, y el pensamiento asociativo verbal relacionado con la creatividad verbal. Posteriormente, los sujetos experimentales realizaron el programa de intervención psicológica que consistió en la realización de una sesión de juego semanal de dos horas de duración durante todo el curso escolar. La sesión se estructuraba con una secuencia de 2 ó 3 actividades y sus debates. Los juegos que contiene el programa estimulan la comunicación, la cohesión, la confianza y el desarrollo de la creatividad, subyaciendo a ellos la idea de aceptarse, cooperar y compartir, jugando e inventando juntos. Los juegos que configuran este programa tienen 5 características estructurales: participación, comunicación, cooperación, ficción-creación y diversión. Los resultados del análisis de varianza sugieren un impacto significativo del programa en la inteligencia verbal, en la capacidad para formar conceptos o definir palabras, y en la capacidad de pensamiento asociativo verbal. Se confirmó un efecto superior de la intervención en los sujetos que en la fase preprueba tenían bajo nivel de inteligencia, pero no se observaron diferencias en función del sexo. Los resultados evidencian el positivo efecto de las intervenciones que estimulan el juego y la conducta prosocial en factores intelectuales.

EFFECTS OF PLAY ON INTELLECTUAL DEVELOPMENT

This line of intervention has its theoretical basis in the conclusions of studies on children's play, which have confirmed that play, the childhood activity *par excellence*, is vital and indispensable for human development. Research on the contribution of play to child development has confirmed its important role in intellectual development (Bruner, 1986; Dansky, 1980a, 1980b; Dockett, 1998; Fisher, 1992; Garaigordobil, 1992, 1995a, 1995b, 1995c, 1996b, 2003a, 2003b; Levy, Wolfgang, & Koorland, 1992; Marbach & Yawkey, 1980; McCune-Nicolich, 1981; Piaget, 1945/1979; Price-Coffee, 1995; Saltz, Dixon, & Johnson, 1977; Udwin, 1983; Vedeler, 1997; Vygotsky, 1933/1982; Yawkey, 1986).

A pioneering work was that of Saltz et al. (1977), who found that fantasy activities produced an increase in IQ, in the ability to distinguish fantasy from reality, and in language. In a similar direction, Marbach and Yawkey (1980) found evidence that an increase in linguistic aptitudes was one of the effects of imaginative play or fantasy, while the work of McCune-Nicolich (1981) confirmed a positive effect of early simulation play on the development of language. Dansky's (1980a) work supported the positive consequences of sociodramatic play for cognitive development and associative fluidity. Udwin (1983), administering an imaginative play programme to institutionalized children, observed an

improvement in their ability to tell stories, and Yawkey (1986) identified the capacity of sociodramatic play for stimulating creative dialogue.

Research carried out in the 1990s also found an improvement in linguistic performance (number of words, specific-words and concept-words) as an effect of a sociodramatic play programme (Levy et al., 1992). A meta-analysis of 46 studies analysing the effects of play programmes confirmed an improvement in performance in the cognitive-linguistic domains of sociodramatic play (Fisher, 1992). In a similar line, the results of a study by Price-Coffee (1995) suggest a positive effect of a structured play programme on cognitive development, with improved language development. This author used a quasi-experimental design to check the differences between the children whose curriculum had incorporated the Wings programme and those with a traditional curriculum. Participants were from four different kindergartens, in one of which the experimental programme was applied. Results indicated that experimental children scored higher in cognition in all areas of reading than those from the three control groups.

The impact of sociodramatic play on language has been studied recently by Vedeler (1997), who analysed the differences between sociodramatic play and other recreational activities. It was predicted that the language in sociodramatic play may be more refined, in the sense of being, for instance, more decontextualized, explicit, and linguistically elaborate. Moreover, it was postulated that sociodramatic play elicited more

advanced syntactic language in 6-year-olds with normal intelligence and linguistic abilities. The conclusions of the study suggested that in socio-dramatic play, more than in any other play activity, the language of the participants was significantly more advanced, refined, explicit, elaborate, and syntactically complex. Subsequently, Dockett (1998) analysed the construction of knowledge through early play, examining the impact of a programme for increasing the complexity of representational participatory play at age 4. The results of that study show that the complexity and amount of representational participatory play increased in the group that had received training in play, but did not increase in the control group.

The main aim of the present work is to test a prosocial and creative play programme oriented to children aged 10 to 12 years, apply it weekly throughout one school year, and assess its effects on verbal and nonverbal intelligence. The study forms part of a research line developed since the 1990s, involving the design, application, and assessment of several psychological intervention programmes based on cooperative and creative play for different age groups, and whose purpose is to promote the development of children's personality (Garaigordobil, 2003a). The antecedents of this research are the design and assessment of three intervention programmes, one for 6- to 8-year-olds (Garaigordobil, 1992, 1995b, Garaigordobil & Echebarria, 1995, Garaigordobil, Maganto, & Etxebarria, 1996), one for 8- to 10-year-olds (Garaigordobil, 1995a, 1995c, 1995d, 1996a, 1999a, 2003b), and one for 12- to 14-year-olds (Garaigordobil, 1999b, 2000, 2001, 2002, 2004). These previous programmes were evaluated experimentally, and it was confirmed that they produced significant benefits in diverse factors of personal and social development in childhood and adolescence.

From a cognitive and interactional perspective, the programme described here contains games that stimulate communication, cohesion, and confidence founded on acceptance, cooperation and sharing, and creating and inventing together. Prosocial and creative games are defined on the basis of five structural characteristics: all the players participate, with no-one eliminated and no winners or losers; they stimulate verbal and nonverbal communication within the group; cooperation is required to reach the goal of the games; they involve representation and creation; and they foment the fun that characterizes all games.

The general hypothesis of the present study is that play will stimulate a significant improvement in the experimental participants; specifically, five hypotheses are proposed. The first three refer to the fact that there will be an increase in: (1) verbal intelligence, in relation to both knowledge of words or vocabulary and the capacity for the definition or formation of verbal concepts (crystallized thinking); (2) non-verbal intelligence, or aptitude for perceiving relationships and completing analogies (fluid thinking); and (3) the capacity for verbal associative thinking in its indicators fluency and originality. Moreover, it is hypothesized (4) that the programme will be especially effective for experimental participants who, in the pretest phase before beginning the intervention, have a low level of development in the intellectual factors measured, and (5) that gender will not have a significant bearing on the effects of the programme.

METHOD

Participants

The sample was made up of 86 participants aged 10–11 years, in four groups from two schools in the Basque Country, northern Spain. From the complete sample, 54 participants were assigned at random to the experimental condition (two groups) while 32 were assigned to the control condition (two groups). Thirty-four of the participants were male and the other 52 were female. The analysis of χ^2 showed no significant differences according to gender, $\chi^2(1, N=86)=3.76$, $p > .05$. Taking into account all the schools in the area, two were chosen at random. The unit of sampling was school class. Each class and the children in it had the same probability of being assigned to the experimental or control condition. The control and experimental groups were equivalent in terms of age, sex, academic aptitude, achievement, and sociocultural level. The participants had an average socioeconomic and educational background: 39% of parents had a university degree, 35% had secondary education, and 26% had elementary education. After selecting the schools at random, a meeting was held with the headteachers and the teachers of the classes involved, who decided to participate in the study after the presentation of the project. Parents had already been informed about the study at a meeting and had given their consent. There were no refusals to participate, nor attrition of the sample.

Instruments

With the aim of assessing the effect of the programme in the pretest phase and the posttest phase, at the beginning and the end of the academic year, two assessment instruments were administered to measure the dependent variables, that is, verbal intelligence, nonverbal intelligence, and verbal associative thinking.

K-BIT; Kaufman Brief Intelligence Test (Kaufman & Kaufman, 1994). The K-BIT measures verbal and nonverbal intelligence in those aged 4 to 90 years. It consists of the Vocabulary subtest (expressive vocabulary and definitions) and the Matrices subtest, and provides an excellent measure of general intelligence. The Vocabulary subtest measures verbal abilities related to school learning (crystallized thinking), based on knowledge of words and the formation of verbal concepts. The expressive vocabulary task consists of giving the word for an object represented graphically, while the definitions task consists of guessing or working out words for which two clues are given. One of these clues is related to the definition of the word, and in the other some of the letters of the word are given. This subtest assesses the development of language and level of verbal conceptualization. It is a measure of crystallized intelligence, of learning and problem-solving approaches that depend fundamentally on formal schooling and cultural experiences. The Matrices subtest measures nonverbal abilities and the capacity for solving new problems (fluid thinking), based on the person's aptitude for perceiving relationships and completing analogies. The items of this subtest are constructed with drawings and abstract figures, thus ruling out cultural influence. The task consists of working out the relationship between various stimuli. In the simplest items the person has to choose from among five figures that which is most clearly related to the stimulus proposed (e.g., a car with a lorry, a dog with a bone). In another set of items, those being tested must choose from among six or eight figures that which best completes a visual analogy (e.g., hat is to head as shoe is to foot). Studies carried out with the test show its validity, reliability, and psychometric robustness. The reliability study was carried out with an analysis using the split-halves method ($N=1341$). Spearman-Brown coefficients were .98 for Vocabulary, .97 for Matrices, and .98 for composite IQ of the K-BIT, and these support the internal consistency of the test. The analysis of test-retest reliability, carried out with a sample of 53 participants and a time interval of 34 days,

obtained a correlation coefficient of .94 for Vocabulary and .86 for Matrices. The study of construct validity was carried out with the K-ABC, with the WISC-R, and with the WAIS-R, coefficients being obtained for the three age groups. In the three age ranges the composite IQs of the K-BIT showed correlations of between .58 and .69 with the sum of the scores in mental processing of the K-ABC, and of .75 with that of the knowledge subtests. Composite IQ of the K-BIT had a correlation of .80 with global IQ of the WISC-R, and of .75 with the WAIS-R.

WAT Word Association Test (Garaigordobil, in press). This test permits exploration of the capacity for associative thinking, through the analysis of two indicators, fluency and originality of ideas. This analysis is carried out by exploring the associations with three concepts made by each individual: story, mother, and lion. For 10 minutes, each person must write all the words that come into his or her mind associated with each of the three words given. In fluency, 1 point is awarded for each association given. Originality is assessed by means of the criterion of statistical frequency of the idea, responses with a frequency of more than 3 scoring 0 points; responses with a frequency of 3 scoring 1 point; responses with a frequency of 2 scoring 2 points, and responses with a frequency of 1 scoring 3 points. In the assessment: (1) all the responses given by the participants for each of the words are listed, and their frequency is recorded; (2) points are assigned for originality of the responses according to their statistical frequency; and (3) the responses of each participant are evaluated. The results of psychometric studies carried out on the test confirm its reliability and validity. Reliability studies carried out with a sample of 139 participants aged 10–12 years confirmed its internal consistency (Cronbach's $\alpha=.84$; Spearman-Brown split-halves coefficient=.88). A further analysis of test-retest reliability after applying the test to 85 participants aged 10 to 12 years supported its reliability, obtaining significant correlation coefficients in fluency and in originality. Studies of the validity of the test ($n=139$ participants aged 10–12) revealed significant correlations of associative verbal fluency in the WAT with verbal intelligence ($r=.34$, $p<.001$). Furthermore, children who showed high originality in the WAT also obtained high scores in verbal intelligence ($r=.24$, $p<.001$). The correlations obtained with the Kaufman and Kaufman's K-BIT (1994) confirmed the construct validity of the test.

Design and procedure

The study employed an experimental methodology, specifically a pretest–intervention–posttest repeated-measures design with control group. In the pretest phase, the K-BIT Kaufman brief intelligence test and WAT word association test were administered to measure the dependent variables on which it was hypothesized the programme would have positive effects. The instruments were applied to the experimental and control participants by the schools' psychologists with the cooperation of psychology students doing their practicals. These students had been trained in seminars prior to the administration of the tests, thus making for greater homogeneity in the collection of data.

Subsequently, the experimental participants took part in the psychological intervention programme, which consisted of a weekly 2-hour play session throughout the academic year. The session was structured with a sequence of two or three recreational activities and their subsequent debates. The play sessions were carried out in the same place—a large, empty room—on the same day and at the same time each week. The intervention was directed by the class teacher corresponding to each group, with the help of an observer. Control participants carried out activities (ethics and plastic arts) from the normal school curriculum, thus receiving another type of instruction and the same level of attention, in order to avoid the Hawthorne effect. In the posttest phase, during the final months of the school year, the same evaluation instruments as in the pretest were applied, in order to measure the change in the dependent variables that were the object of the study.

The research team that carried out the study was made up of the two teachers who implemented the programme in the two experimental classrooms, and the school psychologists and two final-year psychology students who carried out the pretest–posttest evaluation and the filming and observation of the intervention sessions. Training of the team took place fortnightly throughout the academic year. This training focused both on the programme itself (conceptual aspects, methodological issues, etc.) and on its evaluation (application of the assessment instruments). The training seminars included a variety of activities such as discussion of the programme's theoretical concepts, active experience of some of the intervention activities, analysis of intervention sessions filmed on video, and development of specific intervention strategies in view of the difficulties observed.

Furthermore, these seminars had the purpose of checking experimenters' compliance with the programme, that is, how far they followed the standard instructions for its application. Marking of tests was blind, without knowledge of either the condition or the hypotheses, and was carried out by a team of psychology students trained for this purpose.

Intervention programme

The structured intervention based on cooperative and creative games consisted of a weekly 2-hour session involving two or three recreational activities and their corresponding debates. The activities of the intervention programme (Garaigordobil, in press) have two main objectives. In the first place, to promote socioemotional development, stimulating: (1) communication processes within the group (presenting, listening, dialogue, negotiating, making decisions by consensus, etc.); (2) friendly interactions and moral and prosocial behaviour (helping, cooperating, sharing, consoling, etc.); (3) the expression of emotions through words, drawing, or dramatization; (4) improvement of self-concept; and (5) learning of techniques of analysis and resolution of human conflicts. Next, it was intended to promote cognitive development, in: (6) factors such as verbal, graphic, constructive, and dramatic creativity; and (7) other intellectual aspects, such as the capacity for symbolizing, for verbal and nonverbal reasoning, or for associative thinking.

The games included in the programme stimulate communication, cohesion, confidence, and the development of creativity; underlying all of them is the idea of acceptance, cooperation, and sharing, while playing and inventing together. The games constituting this programme have five structural characteristics: (1) *participation*, since in these games all the members of the group participate, nobody is ever eliminated, and there are no winners or losers; the objective consists in reaching group goals, for which each participant has a necessary role in the game; (2) *communication*, since all of the games in the programme promote intragroup communication processes that involve listening, dialogue, decision-making, negotiation, and so on; (3) *cooperation*, since the games stimulate players to help one another in order to contribute to a common aim, a group goal; (4) *fiction and creation*, since the games involve representation of reality, “pretending” that we are lions, trees, tables, and so on, as well as the combination of stimuli to create something new;

and (5) *fun*, since with these games the aim is for the group members to enjoy interacting in a positive, constructive, and creative way with their colleagues. The activities of the programme are structured on the basis of cooperative interactions that promote prosocial behaviour, and are distributed in four modules or types of games: verbal creativity, dramatic creativity, graphic-figurative creativity, and plastic-constructive creativity. The programme uses various group dynamics techniques for the development of the action (games based on communication, cooperation, dramatization, drawing, brainstorming, incomplete sentences, and so on) and other techniques of stimulation and regulation of discussion or debate, such as guided discussion through the formulation of questions.

The application of the intervention programme involved one play session per week. These sessions were carried out at the same time each week, and in the same physical space, an activity room or gym. The sessions were led by the group's class teacher, and always followed the same procedure. First of all, with the group members sitting on the floor in a circle, the aims and instructions of the activity were presented. Next, the group carried out the activity, normally in small teams. At the end of the activity, the group members once again sat down in a circle, the teams presented their conclusions, and a discussion or debate was opened about the activity. This debate phase was a time for reflection and dialogue (guided by the adult) in which the results of the activity performed by the group were analysed. Successively, and following this scheme, two or three activities took place in each intervention session. The session concluded with a brief closing phase. Furthermore, in the first session there was an introduction to the programme, explaining what was going to take place during the coming school year, and in the final session there was a debate in which the members of the group gave their views on the experience.

By way of example, there follows the description of two sessions of the programme. The first of these begins with an activity called "colours and situations," whose aims are to encourage and promote the pleasure of fantasizing and imagining, the habits of active listening in communication within the group, associative thinking, and verbal creativity. In this activity, group members sit on the floor in a circle, in the centre of which are placed cards, each bearing the name of a colour—red, green, black, and so on. One member of the group, chosen at random, takes a card and says aloud the colour written on it. In the following few

minutes, all the players must mention situations or images they associate with that colour. This process is repeated, with the group being asked to associate situations with the different colours that come up successively. In the debate, various questions are raised, such as: Can you see any relation between certain colours and specific emotions? Was it fun to think about and describe situations associated with colours? Which situations have been the most original, the most surprising? Which colours stimulated most associations? An example of the associations made by the group with the colour black were: night, dirty prison, uninhabited and noisy village, sweet coal of Christmas, chimney, hell, when I was little I was afraid of the dark in my grandparents' house and I cried, squid's ink, school macaroni stuck to the pan and burnt, episode of *The Simpsons* where a petrol tanker overturns, car workshop, and bull grazing in a meadow. The objectives of the second game of this same session, "the new evolution of the species," were to promote the pleasure of creating an original animal, the habits of active listening in communication within the group, cooperation, group cohesion, the capacity for transformation of the context, and plastic-constructive creativity. In this game the group is divided into teams of five players, and each team is given 30 photos of different animals, a large sheet of paper, scissors, and glue. The game consists of inventing a new animal species cooperatively. To this end, the members of each team must select the animal photos they like most and cut out the different parts of the body to make the new animal—ears, eyes, and so on. When they have cut out sufficient pieces, they begin sticking them on the paper, making up a new animal formed of parts of animals that actually exist. They must then invent a name for their animal and give a brief description of it—type of animal, diet, habitat, etc. At the end of the game, each team presents its animal to the rest of the group, discussing the description they have written. The debate gives rise to questions such as: Was it fun to invent a new animal? Did you all contribute ideas and help to make the animal? How did you organize your work? How did you choose the name? Which animal was the most original?

The second session that serves as an example begins with the activity "a phrase that rhymes," whose aim is to promote the pleasure of inventing funny rhymes, emotional expression through poetry, the habits of active listening, cooperation, and verbal creativity. In this game, the group is distributed among five teams, each of which receives a card bearing a phrase. Using this phrase,

the team, working cooperatively, must invent phrases that rhyme with it to construct brief, amusing, and original couplets and poems. Afterwards, the members of the group sit in a circle, a representative of each team reads the rhymes and poems created, and a dialogue phase is stimulated, with questions such as: Did you work on the poems together? Which poems were the most original? Was it fun playing with words? Was it difficult? How did you organize yourselves? The aim of the second activity of the session “new endings for old stories” is to stimulate the expression of emotions through dramatization, the pleasure of inventing, communication within the group, cooperation, group cohesion, and verbal and dramatic creativity. In this game, each team, working cooperatively, must invent a new ending for a classic story known by everyone, and that they have been given at random. Subsequently, each team must act out the entire story in turn, with the beginning that everyone knows and the new ending they have invented. In the debate after the game, questions are asked such as: Did you like inventing new endings? Did you all contribute ideas? Did you choose the ending you acted out by consensus? Were there disagreements over the new ending? How were they resolved? Which ending was the most original or surprising? Do you prefer the traditional endings or the ones you’ve invented? Was it fun acting out the story?

RESULTS

With the aim of assessing the change in the variables studied, the means and standard deviations were calculated for each variable in the experimental and control participants, and in the pretest and posttest phases, as well as the posttest–pretest difference, with the raw scores obtained in the variables measured before and after the intervention (see Table 1). Likewise, analyses of variance (MANOVA, ANOVA) were carried out with the pretest data and analyses of covariance (MANCOVA, ANCOVA) of the posttest–pretest differences using the pretest scores as covariates (see Table 1). Second, with the object of clarifying the type of participants for which the intervention was most effective, analyses of variance (ANOVA) were carried out for the posttest–pretest differences in experimental participants with different levels of development (low, medium, high) (see Table 2). Finally, by means of an analysis of variance of the change in the experimental participants (MANCOVA, ANCOVA),

the influence of the variable gender on the effects of the programme was examined (see Table 3). All analyses were carried out with the SPSS 10.0 programme.

Effects of the programme on intellectual development

The MANOVA pretest (Multivariate Pillai) carried out for the set of variables measured revealed significant differences between experimental and control participants, $F(1, 84)=2.88, p < .05$. The results of the MANCOVA for the posttest–pretest differences, taking into account the a priori differences between the two conditions, that is, taking the pretest scores as covariates, were significant, $F(1, 84)=2.97, p < .05$, and the effect size was large ($\eta^2=.167; r=.40$). These results confirm that the posttest–pretest differences between experimental and control participants were significant ($p < .05$), indicating a positive effect of the programme on the intellectual variables explored. In order to analyse the change in each variable, the descriptive and variance analyses shown in Table 1 were performed.

Changes in verbal and nonverbal intelligence.

With the purpose of assessing the impact of the programme on intelligence, analysis was made of the changes in scores obtained in the K-BIT intelligence test. The multivariate analysis of variance (MANOVA) carried out with all the variables of the K-BIT revealed significant differences between experimental and control participants in the pretest phase, $F(1, 84) = 3.46, p < .05$, and in the posttest phase, $F(1, 84) = 7.37, p < .001$. Significant differences were also found in the multivariate analysis of covariance (MANCOVA) of the posttest–pretest differences, $F(1, 84) = 4.47, p < .01$, and the effect size was large ($\eta^2 = .147; r = .38$). The results obtained for each one of the variables in the descriptive analyses (means and standard deviations) and in the analyses of variance (ANOVA and ANCOVA) are shown in Table 1. As can be seen in this table, the experimental participants significantly improved, $F(1, 84)=4.49, p < .05$, their ability to define words, their level of verbal conceptualization ($M=3.06$), with respect to the controls ($M=2.06$). Likewise, the experimental participants significantly improved, $F(1, 84)=4.83, p < .05$, their global verbal intelligence (verbal IQ) ($M=6.30$) compared to the controls ($M=4.16$). Nevertheless, this improvement is due especially to the increase in their capacity for defining words, for forming

TABLE 1
Means, standard deviations, analyses of variance and covariance in experimental and control groups for the intellectual variables

	Experimental group (n=54)						Control group (n=32)						Experimental-Control (n=86)										
	Pretest		Posttest		Pre-Post		Pretest		Posttest		Pre-Post		ANOVA F(1, 84)		Pretest		Posttest		Pre-Post		ANOVA F(1, 84)		
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
K-BIT																							
Vocabulary	36.98	3.48	40.22	4.96	3.24	5.53	36.48	3.41	38.58	3.26	2.10	2.64	0.40	2.71	1.16	0.61							
Definitions *	10.37	3.42	13.43	4.49	3.06	3.43	8.06	3.03	10.13	3.66	2.06	3.35	9.69 **	12.08 ***	1.67	4.49 *							
IQ verbal *	47.55	5.48	53.65	6.60	6.30	5.56	44.55	5.66	48.71	5.81	4.16	3.35	5.03 *	11.99 ***	3.77 *	4.83 *							
IQ nonverbal	30.98	4.89	33.35	5.50	2.37	5.53	30.58	5.31	33.65	6.22	3.06	4.77	0.12	0.05	0.34	2.80							
IQ global	78.33	8.94	87.00	10.56	8.67	8.55	75.13	9.24	82.35	10.57	7.23	6.50	2.46	3.81 *	0.65	0.10							
WAT																							
Fluency *	23.93	12.29	30.69	13.03	6.76	14.50	19.91	9.63	24.44	6.72	4.53	9.75	2.50	6.33 *	0.59	4.06 *							
Originality **	21.76	19.27	35.17	23.25	13.41	24.36	13.25	11.38	20.87	9.81	7.62	13.64	5.15 *	10.90 ***	1.51	6.87 **							

* p < .05; ** p < .01; *** p < .001.

TABLE 2
Means, standard deviations and analyses of variance in each profile for the intellectual variables

	Pretest						Pretest-Posttest differences															
	Profile 1		Profile 2		Profile 3		Profile 1		Profile 2		Profile 3		ANOVA F(2, 51)									
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
K-BIT																						
IQ verbal *	40.18	1.60	46.19	1.84	1.84	54.25	2.77	7.55	4.78	7.63	3.19	7.48	152.03 ***	3.94 *								
IQ nonverbal **	25.68	3.32	31.95	1.47	1.47	36.40	1.59	5.47	6.15	0.95	0.33	3.39	92.13 ***	5.46 **								
WAT																						
Fluency **	11.00	3.23	21.54	3.41	3.41	38.81	10.25	15.86	14.71	6.58	-0.94	17.14	77.61 ***	5.94 **								
Originality	4.88	2.36	13.11	4.24	4.24	42.72	20.09	16.88	17.44	17.25	5.89	31.06	42.41 ***	1.30								

* p < .05; ** p < .01; *** p < .001.

TABLE 3

Means, standard deviations and analyses of variance for the intellectual variables in males and females

	Pretest				Pretest–Posttest differences				ANCOVA		
	Males (n=25)		Females (n=29)		Males (n=25)		Females (n=29)		ANOVA F(1, 52)		F(1, 52)
	M	SD	M	SD	M	SD	M	SD	Pretest	Pre–Post	Pre–Post
K-BIT											
IQ verbal	47.36	5.08	47.34	5.89	7.16	4.39	5.55	6.38	0.00	1.12	1.50
IQ nonverbal	30.32	4.88	31.55	4.91	3.64	4.70	1.28	6.02	0.85	2.52	1.38
WAT											
Fluency	19.92	8.02	27.38	14.28	6.56	12.11	6.93	16.50	5.35 *	0.00	2.54
Originality	17.36	12.47	25.55	23.18	11.88	17.14	14.72	29.45	2.49	0.18	1.37

* $p < .05$; ** $p < .01$; *** $p < .001$.

verbal concepts, given that, although experimental participants also showed greater improvement in vocabulary level ($M = 3.24$) than controls ($M = 2.10$), these differences in vocabulary were not statistically significant. Both in the definitions variable, $F(1, 84) = 9.69$, $p < .01$, and in verbal IQ, $F(1, 84) = 5.03$, $p < .05$, experimental participants and controls showed significant differences in the pretest, with experimentals scoring higher. Thus, the greater level of change found in the experimentals is even more relevant, since controls had a greater margin for growth. With regard to nonverbal intelligence (nonverbal IQ) or ability to solve new problems through the perception of relationships and analogies between elements, there were no differences between experimental and control participants. The data suggest that the programme improved verbal intelligence (crystallized thinking) but did not affect nonverbal intelligence (fluid thinking).

Changes in verbal associative thinking. With the aim of assessing the impact of the programme on capacity for verbal associative thinking, changes in the WAT scores were analysed. The MANOVA carried out with all the variables of the WAT revealed significant differences in tendency between experimental and control participants in the pretest phase, $F(1, 84) = 2.60$, $p = .080$, and significant differences in the posttest phase, $F(1, 84) = 5.39$, $p < .01$. Significant differences were also found in the MANCOVA of the posttest–pretest differences, $F(1, 84) = 3.39$, $p < .05$, and the effect size was moderate ($\eta^2 = .077$; $r = .27$), which suggests a positive effect of the programme on associative thinking. The results obtained in each one of the variables (means, standard deviations, ANOVAs, ANCOVAs), and shown in Table 1, permit the observation that the experimental participants significantly improved their capacity for verbal associative thinking in the indicators

measured. The ANCOVA results confirm that the posttest–pretest difference of means were significant in fluency, $F(1, 84) = 4.06$, $p < .05$, and in originality, $F(1, 84) = 6.87$, $p < .01$. As regards fluency of ideas, the experimentals increased their mean ($M = 6.76$) more than the controls ($M = 4.53$), in the same direction as in the originality of these ideas, with experimentals improving statistically more ($M = 13.41$) than controls ($M = 7.62$). The data suggest that the programme increased verbal associative thinking ability in both fluency of ideas and their originality.

Effects of the intervention on participants with low levels of intellectual development

In order to assess whether the programme was especially effective for participants who, in the pretest phase, before the beginning of the intervention, showed low levels in the factors of intellectual development measured, the experimental participants were classified into three profiles or categories according to their pretest scores. Profile 1 (P1) included participants who obtained raw scores lower than percentile 30, Profile 2 (P2), scores corresponding to percentiles between 30 and 70, and Profile 3 (P3), scores higher than percentile 70. This procedure was used with regard to verbal intelligence (verbal IQ), nonverbal intelligence (nonverbal IQ) and the indicators of capacity for verbal associative thinking (fluency and originality). Subsequently, with the aim of checking whether the programme had a differentially significant effect on experimental participants who, a priori, had different levels of development, ANOVAs were carried out on the profiles in the pretest phase, and on the posttest–pretest differences (see Table 2), in addition to Tukey post hoc multiple comparison analyses. The pretest ANOVAs in the four variables revealed significant differences between the three profiles, that is, they

started out from quite different levels; thus, it is clear that the participants were correctly categorized in the profiles (see Table 2).

As can be seen in Table 2, with regard to verbal intelligence (verbal IQ) (n : P1=11, P2=27, P3=16) the results of the ANOVA confirm that the posttest–pretest difference of means among profiles was significant, $F(2, 51)=3.94, p < .05$. The Tukey multiple comparisons analysis revealed significant differences ($p < .05$) between P2 ($M = 7.63$) and P3 ($M=3.19$), and a tendency to significance in differences ($p < .09$) between P1 ($M=7.55$) and P3 ($M=3.19$). These results suggest that the experimental participants who before the intervention had low or medium levels of verbal IQ in the pretest improved their verbal intelligence significantly more than those who had high levels. With regard to nonverbal intelligence (nonverbal IQ) (n : P1=19, P2=20, P3=15), the ANOVA of the posttest–pretest difference reveals significant differences among the three profiles, $F(2, 51)=5.46, p < .01$. The Tukey post hoc tests showed significant differences ($p < .05$) between P1, which improved much more ($M=5.47$), and P2 ($M=0.95$) and P3 ($M=0.33$). Thus, the experimental participants who had low pretest levels of nonverbal intelligence improved significantly more than those who had medium or high levels.

In capacity for verbal associative thinking with respect to fluency or number of ideas (n : P1 = 14, P2 = 24, P3 = 16), the results of the ANOVA confirm that the difference of means posttest–pretest between the profiles was significant, $F(2, 51) = 5.94, p < .01$. The Tukey post hoc tests revealed significant differences ($p < .01$) between P1 ($M = 15.86$) and P3 ($M = -0.94$). These results indicate that the experimental participants who had a low level in fluency of ideas in the pretest phase improved significantly more than those who had a medium or high level. With regard to originality of ideas in a task that involves verbal associative thinking (n : P1 = 8, P2 = 28, P3 = 18), the ANOVA results for the difference of means posttest–pretest did not confirm statistically significant differences between the profiles, $F(2, 51) = 1.30, p > .05$. Despite the fact that the participants of P3 ($M = 5.89$) showed a lower increase in their mean than those of P1 ($M = 16.88$), and P2 ($M = 17.25$), these differences were not statistically significant (Tukey post hoc tests). In the variable originality, the experimental participants of the different profiles did not change in significantly different ways.

Influence of gender on effects of the programme

In order to assess whether the play programme had a significant effect on the experimental participants according to sex, descriptive analyses (means and standard deviations) and inferential analyses of variance (ANOVA, ANCOVA) were carried out. Their results are presented in Table 3.

The MANOVA pretest carried out with the scores of all the K-BIT variables did not reveal differences a priori according to sex, $F(1, 52) = 0.55, p > .05$. Moreover, neither the results of the MANOVA of difference of means posttest–pretest, $F(1, 52) = 1.56, p > .05$, nor those of the MANCOVA posttest–pretest, $F(1, 52) = 1.08, p > .05$, indicated a differential effect of the programme according to sex. As can be seen in Table 3, the pretest ANOVAs for each variable indicate homogeneity: That is, before the intervention, males and females had similar levels in verbal and in nonverbal IQ. Furthermore, the ANCOVAs posttest–pretest confirm that the changes were similar in the two sexes. Males increased their verbal IQ ($M=7.16$) in the same direction as females ($M=5.55$), and the ANCOVA of the differences posttest–pretest indicates that there are no statistically significant differences in this change, $F(1, 52)=1.50, p > .05$. The same tendency is observed for nonverbal IQ, in which males increase their mean more ($M=3.64$), than females ($M=1.28$), but where the differences are not statistically significant, $F(1, 52)=1.38, p > .05$.

With regard to the results of the WAT, the MANOVA pretest, $F(1, 52)=2.75, p=.073$, shows differences tending towards significance between males and females, but these are due to the differences in the variable fluency, in which females a priori score higher. The MANOVA of the differences posttest–pretest, $F(1, 52)=0.17, p > .05$, and the MANCOVA posttest–pretest, $F(1, 52)=1.28, p > .05$, indicate that there are no significant differences in the change between the two sexes. The data in Table 3 show that in fluency of ideas the change was quite similar in the two sexes (males, $M=6.56$; females, $M=6.93$), with the ANCOVA showing no significant differences between them, $F(1, 52)=2.54, p > .05$. In originality of these ideas, although females improve somewhat more in the mean (males, $M=11.88$; females, $M=14.72$), the ANCOVA does not confirm significant differences between the two, $F(1, 52)=1.37, p > .05$. In sum, the programme did not affect any of the intellectual variables measured in a significantly different way according to sex—that is, males and females improved in a similar way.

DISCUSSION

The results obtained suggest a positive impact of the prosocial and creative play programme on intellectual development. The programme significantly increased ($p < .05$) verbal intelligence, ability to define words or form verbal concepts (crystallized thinking, linked to school learning), and capacity for associative thinking, both in fluency of ideas and in their originality. Nevertheless, it did not have an effect on nonverbal intelligence or the capacity for solving new problems through the perception of relations and analogies among elements (fluid thinking). Thus, there was confirmation of Hypothesis 1, which proposed that the programme would stimulate an increase in verbal intelligence, and of Hypothesis 3, which proposed an increase in the capacity for verbal associative thinking. Moreover, these results are in the same line as those of other studies, which have confirmed a positive effect of play in the development of verbal intelligence—of language (Dansky, 1980a, 1980b; Fisher, 1992; Garaigordobil, 1992, 1995a, 1996a, 2003a; Levy et al., 1992; Marbach & Yawkey, 1980; McCune-Nicolich, 1981; Price-Coffee, 1995; Saltz et al., 1977; Udwin, 1983; Vedeler, 1997; Yawkey, 1986). Thus, the present study supports the positive effect of interventions that stimulate cooperative and creative play—that promote prosocial behaviour—on intellectual factors.

The analysis of change according to levels of development permits the conclusion that experimental participants who in the pretest had low levels of verbal intelligence and of fluency of associative thinking improved significantly more than those with high levels. These results support Hypothesis 4, which proposed that the experience of play would be especially effective for participants who a priori had low levels of intellectual development, thus indicating the therapeutic role of cooperative and creative play. Also, no differential effects of the programme were found according to gender, thus confirming Hypothesis 5 of the study. To summarize, the play programme described here was validated, since it increased verbal intelligence, being especially useful for participants who a priori had low levels of intellectual development.

From a sociocognitive perspective, connections are found in this work between social and intellectual aspects, and the results indicate that by strengthening communication and cooperative interactions within the peer group, intellectual development is fomented. As regards the questions posed by Kihlstrom and Cantor (2000): “Is social

cognition a separate faculty from nonsocial cognition?” and “Is social intelligence anything different from general intelligence applied to the social domain?”, the results of this work permit us to suggest that we are indeed talking about the same faculty.

Among the factors explaining these results may be suggested both the structural characteristics of the recreational activities in the programme (participation, communication, cooperation, fiction, creativity) and the metacognitive importance of the phases of debate and dialogue that take place after each activity. Play is, above all, communication, and facilitates the development of language. Three reasons can be adduced in relation to the effect of the programme. First, it includes linguistic games, the cooperative games of verbal creativity. Second, the play situation demands of the participants a certain development of communicative language for expressing their ideas and wishes, for understanding the instructions, for naming the play objects and their functions, and so on—and all of this opens up enormous possibilities for the expansion of language. And third, collective representational play, like all expressive play, involves language learning because its premise is communication and expression. The characters generally determine forms of verbal behaviour and moreover, the relationship between participants is established through language.

The work has practical implications, and indicates the relevance of experiences of this type for improvement at both the academic and social levels. The results obtained highlight the importance of stimulating prosocial and creative play in children of this age. This information represents a contribution of this study, since a review of the literature shows that interventions based on play are generally employed with preschool children. The present work provides a tool for stimulating child development that fills a void with regard to structured play proposals that can be administered to children of these ages, and completes a line of psychological research based on play for promoting development in 6- to 14-year-olds.

A difference between this work and other studies that have shown the effectiveness of play in the development of language (Dansky, 1980a; Dockett, 1998; Levy et al., 1992; Marbach & Yawkey, 1980; McCune-Nicolich, 1981; Price-Coffee, 1995; Saltz et al., 1977; Udwin, 1983) lies in its showing that play not only has this effect during the preschool stage, but also throughout childhood. Moreover, the majority of studies have demonstrated these effects through the study of

sociodramatic play, and in this work not only sociodramatic play, but also cooperative games in general, with or without representative activity, promote the development of verbal intelligence. Also, and from a transcultural perspective, an important factor to take into account is the cooperative tradition in the Basque culture (in the contexts of business organization, education, etc.), in contrast to more competitive cultures.

Research on the effects of a programme applied in a natural setting has various limitations, since there are numerous variables that may affect the results, such as the assessment instruments employed or the characteristics of the person who administers the programme. One particular limitation of this study is the lack of an evaluation of the characteristics of the adults directing the intervention. Thus, future research may consider assessing the influence of adults on the effects of the programme, or using other assessment instruments to measure intelligence, such as Wechsler's (1991) WISC-III, in order to examine the impact of the programme on other parameters of intelligence. Other suggestions in relation to future studies might include: (1) the use of follow-up measures, (2) a validation according to the Task Force criteria, comparing this programme with others of proven effectiveness, (3) implementation of the programme in therapeutic groups, and (4) assessment of variables of the implementation process.

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