Teaching inclusive values through the inclusive logical disjunction

Pablo Herranz Hernández[1]**, María de Riánsares Sánchez-Beato Garrido**[2]

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[1] Inter-facultative Department of Developmental & Educational Psychology, Faculty of Teacher Training and Education, Autonomous University of Madrid
[2] Faculty of Teacher Training and Education, Autonomous University of Madrid

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Spain

Correspondence: Pablo Herranz Hernández. Calle Pablo Neruda 80, N3, 2ºA, 28922, Alcorcón, Madrid. Spain.
E-mail: pablo.herranz@uam.es

Abstract

Introduction. The logical operator of disjunction has two possibilities, inclusive and exclusive, although the latter is more deeply rooted in our thinking. The present study seeks to analyze whether teaching both types of logical disjunction encourages more inclusive attitudes toward hypothetical social situations that appear as disjunctions.

Method. The study was carried out with boys and girls between the ages of 10 and 13 years. A comparison was made between a condition where pupils received instruction in inclusive and exclusive logical disjunction, and a control group where no instruction was received. We applied a multiple-choice questionnaire that presents social and academic situations related to five aspects of diversity: sexual orientation; education in ethical/religious values; religious flexibility; gender identity and migration.

Results. The results indicate that, except in sexual orientation, participants who received instruction in logical disjunction were more likely to choose the inclusive responses that incorporate both disjunction alternatives, in answering the questionnaire.

Discussion and conclusions. The results show the pedagogical utility of teaching the inclusive disjunction to promote more inclusive attitudes in students.

Key words: Inclusion, exclusion, inclusive disjunction, exclusive disjunction, diversity.

Pablo Herranz Hernández & María de Riánsares Sánchez-Beato Garrido

Resumen

Introducción: El operador lógico de la disyunción admite dos posibilidades, la incluyente y la excluyente, siendo esta última la más arraigada en el pensamiento. El presente estudio trata de analizar si la enseñanza en los dos tipos de disyunción lógica favorece actitudes más incluyentes o inclusivas ante situaciones sociales hipotéticas que se presentan como disyunciones.

Método: El estudio se ha realizado con niños y niñas de entre 10 y 13 años y se compara una condición en la que se realiza una instrucción en la disyunción lógica incluyente y excluyente con otra condición de control en la que no hay instrucción alguna. Se aplica un cuestionario tipo test en el que aparecen situaciones sociales y académicas sobre cinco aspectos relacionados con la diversidad: orientación sexual; educación en valores éticos/religiosos; apertura religiosa; identidad de género y migración.

Resultados: Los resultados indican que, salvo en la orientación sexual, los participantes de la condición de instrucción en disyunción lógica eligen en mayor medida la respuesta incluyente que integra ambas alternativas de la disyunción en las respuestas al cuestionario.

Discusión o conclusión: Los resultados apuntan hacia la utilidad pedagógica de la enseñanza de la disyunción incluyente a la hora de favorecer en el alumnado actitudes más inclusivas.

Palabras clave: Inclusión, exclusión, disyunción incluyente, disyunción excluyente, diversidad.

Introduction

Exclusion refers to the denial or loss of basic human rights (Jiménez et al., 2009). In-clusion, for its part, relates to social inclusion and is the opposite of oppression, including any type of disadvantage or discrimination (Avramidis & Norwich, 2004). According to Parrilla (2002), inclusion is based on the right of all persons to equality, and refers not only to the educational sphere, but also to other areas such as social life, family life, and work life.

When we set our sights on an inclusive school, we must be aware of two sides to the matter. One, an inclusive school has already passed from homogeneity to diversity (Cerrato, 2012); any educator who walks into a classroom will observe that there are diverse students (Gómez, 2005) and this new sociocultural diversity in the classroom demands new pedagogi-cal approaches (Essomba et al., 2019). Two, an inclusive school must adopt an attitude that rejects any expression of educational exclusion (Ainscow & Miles, 2009; Durán et al., 2005; Farrel et al., 2009). There is a need for more inclusive education, where no one is left out, and where we foster students' ability to be agents of their own life and to self-determine that life (Echeita, 2019).

Inclusion inevitably means identifying barriers (UNESCO, 2005), and barriers are not only physical; in inclusive education, barriers relate to learning and participation (Booth & Ainscow, 2000), and may also refer to values, shared beliefs, school culture, and adaptation to diversity (Echeita, 2004; López Melero, 2001; UNESCO, 2010). Although inclusion applies to the school culture, even UNESCO (2004) affirms that there are different social or ethnic groups whose values, attitudes, behaviors or beliefs do not form part of that school culture, and who find themselves limited in terms of their possibilities for learning and participation. Even though these groups may sometimes represent a minority, the Declaration of Salamanca and framework for action on special educational needs (1994) already established that schools should take in children from migrant populations and other minorities.

The concept of culture is very heterogeneous and there is no anthropological consen-sus on its definition, but given today's cultural diversity - taking this term and the concept of culture in a broad sense - it seems helpful to place educational inclusion in an intercultural context. In this regard, Leiva (2008, 2010, 2015) feels that interculturality must include inclu-

sive discourse, so as to encourage a critical spirit concerning the values that it represents in school. In addition, to carry out such intercultural education, all possible cultural manifestations present in the classroom must be addressed (García & Sánchez, 2012).

Therefore, in addition to building culturally heterogeneous environments at school (Arroyo & Berzosa, 2018), it is important to promote inclusive attitudes and cognitive flexibility, since the school scenario is a place of great cultural diversity. One of the five conceptions of inclusion, according to Ainscow and Miles (2008), is precisely that of inclusion as promoting a school for all. It is beneficial to promote inclusive attitudes and improve critical thinking, in the sense of breaking away from ethnocentric attitudes and beliefs that do not allow us to see the existence of other cultural options, sexual options, identity options, etc., and that these options are valid and legitimate. As Duschatzky (1996) has said, when we acknowledge diversity, we are considering an other who helps us to complete our own humanity. And so we enter a state of hybridization where no person or representation appropriates the truth and where binary and exclusive categories are out of place. Instead, we adopt more mixed forms of representing diversity. Perhaps breaking away from these exclusive dichotomies is one of many possible ways to remove barriers to inclusion.

One of these barriers may stem from deep-seated notions like that of the exclusive disjunction, a binary category if there ever was one. In logic, there are operations like the conjunction (which is usually understood or translated as "AND") and the disjunction (which is translated as "OR"), which allow us to join statements and give compound statements their own meaning. For example, for the compound statement "Louis has brown hair or Andrea is redheaded" to be true, it is enough for one side to be true, whether "Louis has brown hair" (statement p), or "Andrea is redheaded" (statement q). In other words, it is enough for one of the two parts to be true. The compound statement is also true when both of its parts are true. Following Garrido (1983) and Deaño (1994), logical disjunction has a truth table as represented in Figure 1.

p	q	p ∨ q
t	t	t
t	f	t
f	t	t
f	f	f

Figure 1. *Truth table of the inclusive disjunction*

In this table, one can see that in the first case, when both p and q are true, the disjunction (p or q) would be true. This would be an inclusive disjunction, understood in the sense that at least one of the two, p or q, is true. The disjunction can be true in three cases: when only p is true, when only q is true, and when both are true (first three cases of the truth table). In ordinary language, however, according to Deaño (1994), the disjunction *par excellence* is the exclusive disjunction, which is true when only p is true or when only q is true, but not when they both are true. In the last case mentioned, such a disjunction would be false. In other words, the exclusive disjunction is understood as either p or q, but not both. In the case where p is true and q is true --first case in Figure 1-- the disjunction is false.

Perhaps for this reason, that the disjunction par excellence is the exclusive case and is the clearest understanding of disjunction (Deaño, 1994), it is difficult or counterintuitive to accept as true or possible that both cases, p and q, occur together. Taking this to the social or educational sphere, when a person or group faces a disjunctive situation and wants to choose both alternatives to which they may lay claim, but are forced to choose only one of the two, they are being excluded. Diversity perhaps applies not only be between individuals, but also within individuals. For example, if we consider bisexuality to be the sexual orientation of persons who feel attraction towards people of both sexes (Frías, 2005; Platero & Gómez, 2007; Sánchez Sáinz, 2009; 2010), are sexually attracted towards persons of the same sex and persons of the opposite sex, forcing them to opt for one of the two is another form of exclusion. It is also a reflection of the corresponding limitations in flexibility or mental openness that these attitudes imply, by not accepting the possibility of inclination toward both, a logically valid option as well as preferable from an ethical point of view. All the more so considering that between 1-2% of men and 3-4% of women consider themselves bisexual (Estupinyá,

2013) and bisexual people are rejected both by heterosexuals and by gays and lesbians, for breaking with the heterosexual/homosexual binary (Borrillo, 2001; Butler, 2001).

Perhaps such exclusions are often implicit, and people tend to think that there is an exclusive disjunction, that an inclusive disjunction cannot be. To implicitly assume that there is only one form of disjunction, the exclusive one, leads to many unjust social exclusions. Hence, if we want to progress toward an inclusive school, we need to break away from these tacit exclusive disjunctions when it comes to attention to diversity.

Objectives and hypotheses

Consequently, the main objective of the present study was to analyze whether a brief instruction on the differences between the logic of inclusive and exclusive disjunction would be able to promote more inclusive beliefs in fifth- and sixth-graders when facing disjunctive options that hypothetically appear in the school environment. With ages from 10 to 13, many of the pupils would be in a transition between the Piagetian period of concrete operations and that of formal operations. According to Piaget, thinking is not formal before this age, and even though the disjunction may be one of the simplest logical operators (unlike the conditional, for example), the pupils might find the task difficult to understand. In addition, using and comparing two school grades would allow us to see whether possible differences between instruction and non-instruction in logical disjunction could be due to age or year in school. For this reason, it was important to rule out this possibly extraneous variable. Boys and girls would also be compared to find any possible gender differences, with the similar, secondary aim of ruling out possible differences between those who receive the instruction and those who do not, due to gender. Being able to rule out the possible influence of such variables relating to gender and age improve the internal validity of the study and its results; as León and Montero (2020) have asserted, being able to reject plausible alternative explanations contributes to internal validity.

Hence, the main hypothesis would be that students who receive a brief written instruction on inclusive disjunction, exclusive disjunction, and the differences between the two, will respond in a more inclusive manner on a brief questionnaire where they are asked about inclusive and exclusive options of a social and school-related nature (sexual orientation, education in ethical/religious values, religious openness, gender identity and migration).

A second hypothesis would be that age, or the fact that pupils might still be in a concrete stage of thinking vs. already in the formal stage, would not influence the number of inclusive responses given on the questionnaire.

A third hypothesis established that there would be no differences between boys and girls in choosing more inclusive answers on the questionnaire.

Method

Participants

Participating in the study were 98 pupils, 47 boys and 51 girls, between the ages of 10 and 13 ($M = 11$; $SD = 0.77$). All students attended a public school in the town of Aranjuez (Madrid Region). The responses of one participant were excluded from the analysis since this pupil could not successfully answer the control questions to indicate understanding of the types of disjunction. Of the remaining 97, 46 were boys and 51 were girls; 49 were fifth-graders and 48 were sixth-graders. Participation was voluntary. Prior to participation in the study, the school administration was sent a letter of explanation, and they in turn contacted the pupils' parents and legal guardians to inform them about the study and obtain their signed written consent.

Instruments

A ten-item, multiple-choice questionnaire was designed. Each question briefly described a situation around a certain character; after the description, an opinion question was posed in regard to the character's situation, and three answer choices were offered. One of the three choices corresponded to the inclusive option, where both options were included. The other two choices corresponded to one of the two options of the disjunction. In this way, for each question, the possible answers included the first option, the second options, or both. The latter constituted the inclusive disjunction, that is, the most inclusive of the three answer choices. The order of appearance of the first option, second option, both options, was varied for each question.

Of the 10 questions posed, two of them (items 1 and 8) focused on the character's sexual orientation. Sexual orientation was conceived as attraction toward another person, whether of the same or opposite sex, in the emotional, sexual, affectionate or romantic (Platero &

Gómez, 2007). In one question the character was a girl, in the other it was a boy. In both situations, the main character felt attracted to persons of their own sex and of the opposite sex. The participant was asked whether this character, from now on, should have relationships with persons of their own sex, of the opposite sex, or if they could have relationships with people of both sexes.

Another two questions (2 and 7) dealt with education in ethical/religious values. [*T.N. In Spanish public education, the subject of Catholic Religion is generally offered throughout pre-university education, with Values Education usually offered as a non-religious alternative. Protestant religion or Muslim religion are other options that have appeared more recently but have little availability.*] One questionnaire item posed whether pupils in a Catholic school ought to be able to take an elective class in Catholic Religion, Values Education, or both. Another item posed the same question in the case of a secular school. Underlying this question is that Ethics and Religion have been interrelated through the centuries (Fraijó, 1994), and there may be alliances between the two.

Two other questions (5 and 6) dealt with religious openness. One question asked whether a Moroccan child who emigrated to Spain ought to be able to study Catholic religion, Muslim religion, or both, at their school. The other item posed the same question, but applied to children who were born in Spain, and who had always lived in Spain. This last question is important for the purpose of breaking away from the assimilationist model, which considers that the minority must adapt to the majority, but the majority need not make any effort to adapt to the minority. Such a model is not inclusive, it goes no further than integration (Echeita, 2007). In an environment such as Spain, where Christians are in the majority, compared to a limited number of Muslims, it is important to formulate both questions, one referring to the majority and another referring to a minority.

Questions 3 and 10 focused on gender identity, understood as one's self-classification as male or female based on components or aspects that have culturally shaped this person over time (López Sánchez, 2013). In other words, not one's gender imposed from birth, but the gender that the person identifies with; it can be female, male, a mixture of the two, or neither (Platero & Gómez, 2007). In the first case (item), a boy character is born with male genitals, but feels like a girl and likes to dress as a girl. The question posed is whether, from now

on, this child should dress like a boy, like a girl, or whatever they want at the time. The other item poses the same issue, but the character is a girl.

Finally, questions 4 and 9 deal with migration. In the first case, a man was born in an African country, came to Spain, and has lived here for eight years. Students are asked if he should feel like he is from Spain, from his birth country, or whether he can feel like he is from both countries. The other case poses a similar question, but applied to a woman born in Spain, who emigrated to Germany.

To perform a conceptual or qualitative validation of the questionnaire, it was evaluated by a group of three experts (a female primary education teacher, and two university teachers, a man and a woman, from the School of Education, *Autonoma* University of Madrid). In this pilot test they were asked to evaluate several aspects, following the validation recommendations of Morales Vallejo (2011): 1) whether the questions were relevant, 2) whether some questions were unnecessary or repetitive, 3) if some question was missing that might be important for the purposes of the questionnaire, 4) if they were well written from a grammatical standpoint, 5) whether they were clear or ambiguous, 6) if one of them contained more than one idea, and 7) if they were easy to answer. After evaluating the questionnaire, the group of experts and the study authors held a meeting to discuss and reach agreement on possible modifications, and to prepare the final version of the questionnaire.

The ten-item questionnaire was applied to all students, but in each classroom, the control version was distributed randomly to half the students, while the other half received the experimental version. The control version was composed of a booklet containing 10 questions; on the first page they were asked to fill in data such as their age, sex and their grade in school. On the following page, before the actual questions, brief instructions explained that they were to read the texts shown, and that below each text there were three answer choices, from which they were to select one.

Students in the experimental condition also received a booklet. As in the control condition, the first page collected their personal data. This was followed by three pages where they received instruction about inclusive and exclusive disjunction. First, the word "or" and its meaning were discussed. Afterward, using an example, it was explained that sometimes a disjunction is exclusive and only allows one of the two options, but other times both options

can apply at the same time, so the disjunction is inclusive. After this, another example of an inclusive disjunction was shown, with an explanation of why it was inclusive. The same process was followed with an example of an exclusive disjunction. Following the two examples, there was an explanation of the difference between the two.

On the third page of instructions, two examples were given for them to mark as inclusive or exclusive. They were to mark the option that they considered to be correct in the first example and in the second. The first case was exclusive and the second inclusive. The two questions were used to control comprehension of the instruction on inclusive vs. exclusive disjunction. Only when the two examples were answered correctly were their answers to the subsequent questionnaire considered valid. Only one of the participants missed one of the example items, so he was eliminated from the analysis. After the sample questions, the following pages contained the same questionnaire described above for the control condition. Prior to the questions, a single paragraph explained that they were to read the texts that followed and then choose one of the three choices offered as their answer, just as in the control group.

Procedure

The questionnaire was applied in fifth- and sixth-grade classrooms, two classes for each grade. In each classroom, the questionnaire with the experimental format was randomly handed out to half the students and the control version of the questionnaire to the other half. This randomization was an attempt to attenuate the influence of other possible extraneous variables, aside from the above-mentioned variables of gender and age, and so favor internal validity. Participants were told that, in order to collaborate adequately with the study, it was important for them to read and give honest answers to the questions posed.

Data analyses

Data analyses were performed using SPSS version 21. Student's *t* was calculated to determine whether there were significant between-group differences.

Results

After excluding the protocol from the only student who did not correctly respond to the two control questions, there were 97 remaining protocols, of which 48 were from the experimental condition and 49 from the control condition.

The ten questions constituted five pairs, as explained earlier. The two questions from each pair appeared in the order described in a previous section. For each question, participants could choose the inclusive option or either of the other options. Scores were calculated as the number of times that the inclusive choice was made in each pair. Thus, the score assigned to each pair could be zero, one, or two inclusive responses. Table 1 presents mean scores (between zero and two) of inclusive responses for each pair, according to age and grade, as well as total mean scores (between zero and ten).

Table 1. *Mean scores of inclusive responses per pair, according to grade in school*

Pair	Grade in school	Mean score	Standard deviation	Difference of means
Sexual orientation	Fifth	1.98	.14	.02
	Sixth	1.96	.20	
Ethical/religious values	Fifth	1.94	.24	.04
	Sixth	1.90	.31	
Religious openness	Fifth	1.78	.62	.03
	Sixth	1.75	.60	
Gender identity	Fifth	1.90	.42	.00
	Sixth	1.90	.43	
Migration	Fifth	1.92	.28	.02
	Sixth	1.90	.31	
Total	Fifth	9.51	.74	.11
	Sixth	9.40	1.20	

In order to determine whether differences were significant, Student's *t* test was applied to each pair and also to the total questionnaire score. Regarding sexual orientation, no significant differences were found in the number of inclusive responses according to grade in school ($t = 0.6$; $p = .55$).

Regarding ethical/religious values, no significant differences were found in the number of inclusive responses according to grade in school ($t = 0.76$; $p = .45$). With regard to religious openness, such differences were also absent ($t = 0.21$; $p = .84$).

With regard to gender identity, significant differences according to grade in school were also absent ($t = 0.03$; $p = .98$).

Likewise concerning migration, no significant differences were found according to grade in school ($t = 0.38$; $p = .71$).

Finally, regarding the questionnaire total score, which included the 10 questions pertaining to the 5 pairs, no significant differences were found according to grade in school ($t = 0.56$; $p = .57$).

In addition, the mean scores of inclusive responses were also considered according to participants' gender. Table 2 presents these results for each of the five pairs and for the total score of all pairs.

Table 2. *Mean scores of inclusive responses per pair, according to gender.*

Pair	Gender	Mean score	Standard deviation	Difference of means
Sexual orientation	Male	1.96	.21	-.02
	Female	1.98	.14	
Ethical/religious values	Male	1.93	.25	.03
	Female	1.90	.30	
Religious openness	Male	1.70	.66	-.13
	Female	1.82	.56	
Gender identity	Male	1.80	.58	-.18
	Female	1.98	.14	
Migration	Male	1.91	.29	.01
	Female	1.90	.30	
Total	Male	9.30	1.07	-.28
	Female	9.59	.90	

Just as before, Student's *t* test was applied to determine whether differences were significant in each pair, and also for the questionnaire total score.

Regarding sexual orientation, no significant gender differences were found in the number of inclusive responses ($t = -0.67$; $p = .50$).

Regarding ethical/religious values, no significant gender differences were found in the number of inclusive responses ($t = 0.58$; $p = .56$).

Such differences were also absent in regard to religious openness ($t = -1.03$; $p = .30$).

With regard to the topic of gender identity, significant differences were also absent ($t = -2$; $p = .051$). Notwithstanding, there is an appreciable trend in that the girls selected the inclusive response more often than did the boys. Concerning migration, no significant differences were found according to gender ($t = 0.19$; $p = .85$).

Finally, regarding the questionnaire total score, including the 10 questions pertaining to the 5 pairs, no significant differences were found according to gender ($t = -1.42$; $p = .16$).

With regard to the two experimental conditions of the study, Table 3 shows the mean scores of inclusive responses obtained in each question pair, according to the participant's experimental condition, as well as the total mean score for all the pairs.

Table 3. *Mean scores of inclusive responses per pair, according to experimental condition*

Pair	Condition	Mean score	Standard deviation	Difference of means
Sexual orientation	Experimental	1.98	.14	.02
	Control	1.96	.20	
Ethical/religious values	Experimental	1.98	.14	.12
	Control	1.86	.35	
Religious openness	Experimental	1.96	.20	.38
	Control	1.57	.79	
Gender identity	Experimental	2.00	.00	.20
	Control	1.80	.58	
Migration	Experimental	1.98	.14	.14
	Control	1.84	.37	
Total	Experimental	9.90	.31	.88
	Control	9.02	1.22	

In order to determine whether differences were significant, Student's *t* test was applied to each pair and also to the total questionnaire score.

Regarding sexual orientation, no significant differences were found in the number of inclusive responses according to experimental condition ($t = 0.56$; $p = .57$).

Regarding ethical/religious values, significant differences were found, in that the Experimental Group more often selected the inclusive response (t = 2.23; p <.05).

Regarding religious openness, significant differences were also found in favor of the experimental group. In other words, the experimental group chose the inclusive response in greater measure than did the control group (t = 3.32; $p < .01$).

Regarding gender identity, significant differences were found, in that the Experimental Group selected the inclusive response in greater measure (t = 2.48; $p < .05$).

Concerning migration, significant differences were found. The experimental group chose the inclusive response in greater measure (t = 2.49; $p < .05$).

Finally, regarding the questionnaire total score, which included the 10 questions pertaining to the 5 pairs, significant differences were also found, in that the experimental group chose inclusive responses in greater measure than did the control group ($t = 4.88$; $p = .001$).

Discussion and Conclusions

When considering participants' age or grade in school, no significant differences were observed in any of the pairs analyzed. In other words, children in both fifth and sixth grade chose the inclusive response in the same degree. Likewise, no differences were found when considering all the pairs as a whole. Therefore, considering the hypothesis related to age or stage of development, it seems that the amount of inclusive responses is not related to enrollment in fifth or sixth grade in school, or to being in the stage of specific operations vs. the stage of formal operations. Nonetheless, these results should be considered within the context of these specific classrooms and school. They cannot, therefore, be generalized, nor can they

be extrapolated to other grades in school or to other schools in the same town or different towns. In this regard, it would be interesting to do a descriptive study with a broader, stratified sample, at the national level, for example.

Regarding participants' gender, generally speaking, the results of the analysis did not produce differences between boys and girls in the degree that they selected inclusive responses, just as was established in the hypothesis on participants' gender. It seems that boys and girls evenly selected the inclusive response. One possible exception to this may be the non-significant trend mentioned, where the girls tended to select the inclusive response more than the boys in the pair related to gender identity. Being no more than a trend, no conclusions may be drawn, but it would be interesting to carry out further research in this direction. As in the former case, these results should be limited to the current study sample, without generalizing them to other schools or other regions, since the pertinent descriptive studies would be required.

Regarding the experimental condition, based on overall results corresponding to the total scores of all pairs, the instruction provided to students about the inclusive and exclusive disjunction visibly contributed to their choice of the inclusive alternative as the most desirable, in the social and moral aspects addressed in the questionnaire. Therefore, the main hypothesis is also fulfilled: the more inclusive scores of participants who received instruction on disjunction seem to be due to this condition and not to the fact of being younger or older or of being boys or girls. In other words, the age and gender variables did not contaminate the results, thus favoring internal validity of the study.

Let us consider each pair. In the sexual orientation pair, there were no significant differences between the experimental and control groups. Given that very high scores were seen in both groups (close to the maximum of 2), there seems to have been a ceiling effect. This may reflect that the boys and girls in the study were already very inclusive in the matter of sexual orientation. If this were so, the instruction on disjunction and its types would not foster greater openness than what they already had. However, we must exercise caution and wait for further research in this regard. This is especially so, unfortunately, because bisexual persons are less well known and experience a greater degree of rejection than do lesbians or gays (Cornejo, 2012; Moreno & Puche, 2013); there are stereotypes that bisexual persons are licen-

tious and confused (Agustín, 2009). Hence the importance of continued research in this area, not only in social spheres but also in educational spheres.

As for the other pairs (ethical/religious values, religious openness, gender identity and migration), although the scores are generally high, there are differences in favor of the experimental group, who received instruction on the disjunction and its types. Therefore, from the point of view of educational inclusion, as well as education in values, these results are promising.

Specifically in the pair on ethical/religious values, regarding the possibility of taking a class in Religion, in Values Education, or taking both, more inclusive responses were seen in the group that received prior instruction on the types of disjunction. It is possible in our country that the matter has been over-politicized, and for this reason it has become so polarized. There may be environmental influence in the sense that one must defend one option or the other. Hence the importance of teaching that there is a possibility of including both in the curriculum, as an inclusive option. This is particularly so when Religion and Ethics have gone hand in hand through the centuries, and all religions have moral codes (Fraijó, 1994).

In similar fashion, in the pair concerning religious openness, more inclusive responses were observed in those who received disjunction instruction. This result is important for encouraging inclusive, open attitudes toward other religions. This is vital in contexts where persons from different religious backgrounds must live together, as is the case in our country. When there are religious minorities, there is danger that the majority may adopt assimilationist models (Echeita, 2007).

As for the pair relating to gender identity, students who received the disjunction instruction were also influenced toward a more inclusive response. This result highlights the importance of teaching students to maintain more open positions on gender identity, given that children at these ages are constructing their gender schema, and the surrounding environment is often very rigid and stereotyped in concepts of gender and gender identity. According to Butler (2015), gender need not be considered as always either male or female, and so fall into binarism; aspects that do not fit into binarism belong to gender just as much as its more normative case. Hence the importance of teaching that aims to make the concept of gender and gender identity more flexible, promoting more androgynous conceptions about gender

and breaking away from the social dichotomy (Bem, 1981). In this way we help reduce barriers to inclusion, since reducing these barriers involves thinking and acting differently about gender (Booth &Ainscow, 2015).

In the migration pair, more inclusive responses were also observed in the group that received disjunction instruction. When asked where immigrants should feel that they are from, whether from their host country, from their birth country, or both, participants who had received instruction in disjunction types more often responded both. This is a positive result, given that the inclusive response implies more openness toward immigrants; this should be fostered in the classroom, doing away with negative ideas and prejudices about immigrants. At the end of the day, immigrants do not produce negative effects, but may even bring about positive synergies in the classroom (Morán Calatayud, 2019).

Based on the results of the present study, by applying disjunction logic to the question of the values considered here, we see how something as simple as teaching how to differentiate the types of disjunction, and showing that a disjunction need not be exclusive only, helps encourage students to choose the more inclusive, open option.

Teaching on disjunction and its types could be applied to the sociomoral realm of values, helping to improve these in the sense of encouraging more inclusive attitudes. This would follow in line with Muntaner (2014), in that teachers are to pursue inclusion through a change in attitude that favors acceptance among students, mediated by inclusive methodologies along with heterogenerous groupings. The results of this study would fit into this perspective of encouraging inclusive attitudes.

The results of the present study also follow the line of fostering dialectic thinking, closer to the cognitive development of adult persons, where contradictory situations are better managed (Corral, 1998). In this way, the options are not seen as exclusive, but dialectical integration is promoted, by which opposites are harmonized in the Hegelian sense.

For this purpose, it may be useful to make the tacit aspect of the disjunction more explicit. For example, when speaking of bisexuality as opposed to heterosexuality and homosexuality, the three options can be taught as alternatives, where bisexuality would correspond to the inclusive disjunction. In other words, we can express questions of a social nature using

the terms of disjunction logic, whenever this logical schema can be applied, and so promote inclusion. It is true that diversity often encompasses more than two inclusive options, so all alternatives have to be taken into account, and the most open, fair and inclusive alternatives identified. Inclusive education considers heterogeneity to be a positive characteristic, since reality itself is heterogeneous (García Rubio, 2017). In such cases, the classic bivalent logic scheme applied to two propositions or alternatives is insufficient. But as a first attempt toward inclusion, it may be a useful place to start. For example, in the case of religion, Ansede (2013) estimates that there are some 4200 different religions in the world. While bivalent logic falls short, in an environment where there are children from an Islamic culture living alongside other children whose religious culture is Christian, teaching the inclusive disjunction can be a start toward religious openness. Future studies, therefore, could move further in the line of including multiple inclusive options, often required by the existing social diversity.

In this regard, every effort devoted to investigating such results or conclusions, applying more circumstances, persons, times, etc., could contribute to external validity. Nonetheless, we must not forget that external validity has received diverse considerations. According to León and Montero (2020), while some researchers feel that the absence of external validity produces knowledge that is not applicable outside the laboratory, others consider that when a researcher finds changes that are owing to his or her manipulations, the objective has been met. Perhaps the most sensible thing is to balance both positions, and follow these authors in saying that an experiment can be meaningful when it helps improve our understanding of the phenomenon in question. The present study, while limited to the sample and environment from which the data were obtained, at the least sheds some light on the possible influence of disjunction instruction on attitudes towards social situations that lend themselves to being conceived in the light of inclusive or exclusive logic. In any case, future studies that expand the sphere of application or generalizability of the results will always be welcome.

In addition, this study attempts to modestly address, perhaps oversimplifying, no less than five areas or lines of values. The desirability of expanding the focus of each of these areas --and other areas not included here-- goes without saying. The aim of such analysis is to discover how educational and social inclusion can be fostered from the realm of Education, whether or not through disjunction. Future research could follow this line of collecting more aspects that lend themselves to disjunctive analysis, for the sake of promoting social inclusion. Students' ages or their grade in school could also be extended in future analyses, in or-

der to observe what happens at other stages of education. In the age range analyzed here there seem to be no differences between the older and the younger ones, that children in both grades benefitted from instruction in inclusive disjunction, but it would be useful to analyze what happens when considering older and younger children than those included here. Similarly, while there seem to be no gender differences in the present case, that does not mean that gender differences do not exist at other ages. For this reason, studies with other age groups should be carried out to determine whether gender is a factor of influence on students.

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