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Young children's environmental judgement and its relationship with their understanding of the concept of living things

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ABSTRACT

Do young children think that plants deserve morally-based respect or, on the contrary, do they feel that respect for plant life is nothing more than another behavioural norm similar to, for instance, one that states that you should not pick your nose in public? This study examines how dilemmas involving environmental, moral and socio-conventional situations are comprehended in early childhood so as to investigate the issue of whether young children attach a significant degree of severity to transgressions against plant life in comparison with disregarding socially accepted rules. Additionally, young children's judgements are put into perspective alongside their understanding of the concept of living things in order to shed light on the role that grasping essential biological notions might play in the emergence of young children's assessments of actions that pose a threat to the environment. The sample of the study consists of 328 children (162 girls and 166 boys) who attend Early Years Education or Primary Education and the data examined comes from the individual interviews conducted with the children. The results are discussed in connection with the current understanding of the source of ethical judgements which emphasises the importance that emotions seem to play in the construction of moral thinking.

KEY WORDS: early education, biological understanding, environmental awareness, moral intuition

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1. Introduction

The current global environmental situation sparks interest in examining how people become mindful of the impact that their activities have on the environment. In this regard, the study of the personal factors that support an individual's motivation to protect the environment stands out as a very significant line of research (BRATANOVA ET AL., 2012; CLAYTON ET AL., 2015).

Environmental conceptual understanding has been identified as a significant factor in relation to the construction of one's environmental awareness (GIFFORD, 2014; GIFFORD & NILSSON, 2014). Thus, several studies have examined how biological knowledge appears to be related to environmental awareness (ARDOIN ET AL., 2015; HO ET AL., 2014; ROBELIA & MURPHY, 2011) and the general conclusion is that knowledge is necessary but, to some

extent, insufficient for adopting pro-environmental behaviour (GIFFORD & NILSSON, 2014).

However, the connection between environmental concerns and environmental knowledge turns out to be inconsistent when it comes to the evidence collected in the arena of early years education. Thus, on the one hand, some research suggests the significant role that the understanding of biological concepts seems to play in the emergence of environmental concerns during preschool age (ERGAZAKI & ANDRIOTOU, 2010). In the same vein, other studies are premised on the assumption that young children's cognitive abilities and the subsequent understanding of environmental issues shape their judgements on environmentally harmful actions (HUSSAR & HORVATH, 2011).

On the other hand, it has been suggested that young children's environmental concerns seem to be independent of their conceptual understanding

within the biological domain. More specifically, VILLARROEL (2013) studied the relationship between young children's judgements concerning damaging actions against plants and their skills to correctly distinguish living things from non-living entities. The data gathered in this preliminary study indicated that young children attach a noteworthy severity to actions that pose a threat to plant life; while, at the same time, displaying a significant lack of understanding regarding the notion of living things (including the fact that plants are not inanimate entities). The author concluded that *"to some extent, both domains of knowledge (the* [environmental] *normative thinking and the biological understanding) are, at least initially, unrelated"* (VILLARROEL, 2013, p. 11)*.

Behind these contradictory statements there might be the fact that too little research has been undertaken regarding the emergence of environmental awareness in early childhood (COLLADO ET AL., 2015) and, even less, on the topic of the relationship that environmental judgements in early childhood display with conceptual development in the biological domain and, particularly with an understanding of the notion of living beings. In this regard, it is worth noting that the comprehension of what distinguishes living things from inanimate entities is a key conceptual milestone that children need to grasp in order to achieve further conceptual understandings in the biological domain (SCHROEDER ET AL., 2010).

Accordingly, this study aims to provide additional evidence on the subject of the relationship that an emergence of environmental concern in early childhood has with young children's conceptual accomplishments in the biological domain. Particular emphasis is placed on testing, by means of a larger sample, the assumption posed by VILLARROEL (2013) that young children's judgements regarding the appropriateness, or inappropriateness, of actions in the environment might emerge earlier in their development than their understanding of the concept of living things.

To this end this study firstly examines, to what extent a sample of children in their final stages of Preschool Education and at the very beginning of

Primary Education (between the ages of 4 and 7) are capable of accurately distinguishing living things and inanimate entities. The information collected is broken down into educational levels and by sex in order to confirm whether there might be any statistical differences related to these factors. Then, the issue of how the children in the sample judge environmentally harmful actions are also examined. For this purpose, and in line with previous research (HUSSAR & HORVATH, 2011; VILLARROEL, 2013), the responses made by the children in the sample when facing dilemmas involving environmental, moral and socio-conventional transgressions, are studied. The data in this analysis is also considered by educational levels and by sex.

This research project aims to gain insight into the relationships that the early stage of conceptual understanding, linked to the biological domain, may have with the judgements that young children express in connection with the environment. For this objective, the pattern of responses given by the children in the sample when tackling the dilemmas involving the environment and moral and socio-conventional transgressions, are put into perspective with their understanding regarding the notion of living things.

Notably, the final purpose of this study is to provide further evidence to support a better understanding of the emergence of environmental awareness in early childhood which may ultimately assist in the design of more effective proposals for environmental education.

2. Methods

2.1. Sample

The study – which was approved by the Ethics Committee for Research on Human Beings at the University of the Basque Country – examines the data provided by interviews undertaken with 328 children (162 girls and 166 boys) attending either Early Years Education or Primary Education. Table 1 shows the detail in the composition of the sample according to academic level of the children.

Table 1. Composition of the sample according to the educational level of the participants

	School year	N	Year of birth	Age at the time of the study
Early Education	Penultimate year of preschool level	138	2008	4-5
	Final year of preschool level	91	2009	5-6
Primary Education	First year of primary level	99	2010	6-7

To gather this sample, 6 state-run primary schools were visited. The schools were selected in accordance with the criteria of availability and proximity to the members of the research team. Five of these schools are located in the province of Biscay (the Basque Country, Spain) and one is in the region of Las Merindades, in the north of the province of Burgos (Spain). Three schools belong to middle-sized towns, with more than 75,000 inhabitants and the others to villages situated in rural areas, with between 1,500 and 4,000 residents.

2.2. Data collection

As far as the data presented in this study is concerned, it was collected by individual interviews with the children in the sample during the second term of 2015. All the data analysed comes from the responses that the children gave to two different tasks: the *Environmental Judgement Test* and the *Living/Non-living Distinction Test*. A description of these tasks is presented below. Moreover, children's name, sex, academic year, together with their month and year of birth, were also registered.

Permission for the interviews was requested in writing to both the board of directors of each of the schools involved in the study and the parents or guardians of the children. The individual interviews were undertaken during the pupils' school timetable, inside their normal classroom. A partition was prepared with the support of the classroom teacher prior to the beginning of the meetings with a view to guaranteeing privacy regarding the children's work. The interviews with the children never took more than 15 minutes.

2.3. Tasks

During the individual meetings two tasks were given to the children: the *Environmental Judgement Test* and the *Living/Non-living Distinction Test* (henceforth referred to as *EJT* and *LT*). What follows is the description of the background to these tests, the explanation of the material and procedure used and the variables drawn from each of the tasks.

2.3.1. *Environmental Judgement Test* (*EJT*)

The *EJT* version utilized in this study was implemented by VILLARROEL (2013) and it is in line with the test developed by HUSSAR & HORVATH (2011) on the basis of Turiel's social-domain theory (TURIEL, 1983; SMETANA, 2006). The *EJT* examines children's responses to dilemmas presented by means of pictures. Each of the pictures show a scene of inappropriate behaviour related, in all instances, to one of the following domain:

- The moral domain; when the misbehaviour affects the welfare of others;
- The socio-conventional domain: in the event that the misconduct breaks a social rule; while not affecting the well-being of others;
- The environmental domain: in the case that the wrongdoing has an undesirable effect, particularly, on plant life;

Table 2 presents a brief description of the scenes shown in each of the pictures (20 cm x 10 cm). Additionally, this table provides information regarding the source of the pictures (primarily, picture books for children) and also the domain to which the scenes of the pictures belong.

The *Environmental Judgement Test* is carried out individually. The interview begins with the introduction of the pictures and the subsequent two questions that the researcher posed to the child: *what is happening in this picture? Do you think that it is right to do this?* The objective of these questions is to guarantee that the participant clearly understands the transgression that each scene illustrates.

In the unusual event that the child had difficulties in appreciating the behaviour that a certain image represents, the interviewer may have helped the child grasp the meaning of the scene, but at no point was any observation regarding the appropriateness, or inappropriateness, of the behaviour given.

Later on, the pictures are presented to the child in sets of two. Four times, each of the images related to the socio-conventional domain were presented in tandem with one of the pictures linked to the moral domain. After that, another four times the same socio-conventional domain pictures are presented again but, in this case, jointly with an image belonging to the environmental domain. Table 3 displays the description of the eight sets of the two images presented in the *Environmental Judgement Test*.

Together with each set of two pictures, the child is asked the following question: *You told me that this conduct is wrong* [pointing at one of the pictures] *and also, you told me that this one is wrong too* [pointing at the other picture] *but, which is the most negative behaviour?* The objective of the question is to examine which one, between the two transgressions illustrated, the child attaches greater importance to. For the full description of the Pictures, see Table 3.

The information recorded for later quantitative analysis is how many times, in each interview,

the transgressions regarding both moral and environmental domains have been considered to be more serious than those related to the socio-conventional domain.

2.3.2. *Living/Non-living Distinction Test* (*LT)*

This task aims to measure young children's competence to correctly distinguish living things from inanimate entities. The test was developed by Leddon et al., (2009), following the methods proposed by Osborne & Freyberg (1985) and it has been successfully used in similar studies (see for instance Villarroel, 2013).

The test assesses young children's skills to differentiate living beings from inanimate entities by means of eight photographs (20 cm x 10 cm). These are close-up photographs of eight entities belonging to 4 different categories: *plants*, *animals*, *vehicles* and *natural phenomena*. Table 4 breaks down the specific entities used and the category to which they belong.

Table 2. Detailed information regarding the pictures used to conduct the *Environmental Judgement Test*

Picture	Description of the situation shown in the picture	Source of the picture	Domain of the transgression
Picture 1	A girl picks up another child by the collar while violently threatening to strike	Thomas & Harker, 2000	Moral domain
Picture 2	A girl takes a sweater from another's schoolbag without permission. The owner has her back to the offender and is not aware of what is happening	Thomas & Harker, 2000	
Picture 3	A boy is unexpectedly soaked with a garden hose by a classmate showing her disgust at that	Llewellyn, 2001	
Picture 4	A boy is hurt by having fallen to the ground while his three mates are laughing at him without providing any help	Bethel, 2011	
Picture 5	A girl is picking her nose	Aliki, 1990	Social-conventional domain
Picture 6	A boy is eating soup so fast that it flies out of the dish, dirtying the table	Aliki, 1990	
Picture 7	A girl, doing her homework, leaves her desk and place of study messy and untidy	McKissack & McKissack, 1998	
Picture 8	A child is passing wind in a library while taking a book	Wright, 2013	
Picture 9	A flower is about to be stepped on by a cartoon character	Gomboli, 1997	Environmental domain
Picture 10	A heart is being carved on a tree trunk by means of a knife by a cartoon character	Gomboli, 1997	
Picture 11	A tree is being uprooted by a bulldozer operated by a cartoon character	Wolschke-Bulmahn & Gröning, 1994	
Picture 12	A boy hanging from a treetop is making the tree bend dangerously, nearly to breaking point	Frost & Koeppen, 1994	

Table 3. Description of the pairs of images used in the *Environmental Judgement Test*

The pictures in comparison	Description of the situations in comparison	Domains of the transgressions
Picture 3 versus Picture 7	*Being unexpectedly soaked* versus *Leaving the place of study messy and untidy*	Social-convention versus Moral domain
Picture 6 versus Picture 1	*Eating soup too fast* versus *Violently threatening a colleague*	
Picture 5 versus Picture 2	*Nose picking* versus *Taking another's belongings w/o permission*	
Picture 8 versus Picture 4	*Passing wind in a public space* versus *Not helping someone who has fallen*	
Picture 4 versus Picture 13	*Being unexpectedly soaked* versus *Bending a tree dangerously*	Social-convention versus Environmental domain
Picture 6 versus Picture 9	*Eating soup too fast* versus *Stepping on a flower*	
Picture 5 versus Picture 10	*Nose picking* versus *Carving into a tree trunk*	
Picture 8 versus Picture 11	*Passing wind in a public space* versus *A tree being uprooted by a bulldozer*	

Table 4. List of the entities displayed in the photographs used in the *Living/Non-living Distinction Test*

Living beings		Inanimate entities	
Plant category	A tree A flower	*Vehicle category*	A car A motorcycle
Animal category	A dog A bird	*Natural phenomena*	The sun Some clouds

The test begins by asking the child the following question: *What appears in this picture?* The only objective of the question is to verify that the child does not have a problem recognising the entity shown in the image. Later on, the interviewer turns to examine how the child classifies each entity shown in terms of being a living thing or, alternatively, an inanimate object. To that end, and in line with the proposal posed by LEDDON ET AL. (2009), the child is asked the following: *Is "X" a living thing?* ("X" is each entity displayed).

The information registered for further quantitative research is whether or not the child is able to correctly classify all the entities presented in the pictures and, if not, which categories of entities (*plants, animals, vehicles* and *natural phenomena*) they categorise correctly. In this connection, and following the criteria suggested by previous research (VILLARROEL, 2013), both of the pictures belonging to a certain category have to be correctly classified in order to consider that the participant performs correctly in that category.

2.4. Data analyses

The variables considered in this study are as follows:

- Sex, age and educational level of the children;
- The total number of misconducts against plants that each child assesses as more negative than breaking a social rule. This is a discrete variable taking one integer in the range of 0 to 4;
- The total number of misconducts related to the moral domain that each child assesses as more negative than breaking a social rule. This is a discrete variable and takes one integer in the range of 0 to 4;
- Whether or not the two entities belonging to each category in the *LT* task (*plant*, *animal*, *vehicle* and *natural phenomena*) have been correctly classified as living or non-living things. This is a categorical variable that takes one of two possible values (right or wrong).

With respect to the statistical procedures, the association between categorical variables is examined by Chi-square and, the corresponding size effect through Cramer's V (KLINE, 2004).

Furthermore, the non-parametric Kruskal–Wallis test (SIEGEL & CASTELLAN, 1988) is used to analyse the relationship between discrete and categorical variables. No parametric analysis was used due to the fact that the quantitative variables are discrete and cannot be consistent with a normal distribution. In the latter case, the *size effect* was calculated by means of the parameter ETA-squared ($\eta2$) (MORSE, 1999; PRAJAPATI ET AL., 2010). Moreover, the Binomial test was used to study the deviations of the observed frequencies from a theoretical random distribution (WELKOWITZ ET AL., 1996). The level of significance utilized in the study was 0.05 and the statistical study was performed using the SPSS version 19 software.

3. Results

The results of the data analysis obtained from the interviews with the children in the sample are presented below. Firstly, the figures provided by the study of the responses of the participants to the *Living/Non-living Distinction Test* are broken down and, after that, the data from examination of the answers to the *Environmental Judgement Test*.

In the introduction of the results of both tasks (*LT* and *EJT*), the results for the whole sample are detailed first, and after that, the results by academic level and by sex. Finally, there is a consideration as to what extent the answers provided by each task substantially differ from a random distribution.

3.1. *Living/Non-living Distinction Test* (*LT*)

14.3% of the children correctly classified all the entities presented as living or non-living things. However, children at different educational levels performed differently. Thus, only 2.2% of the children in the penultimate year of preschool (4-5 years old) were able to complete the whole test successfully. The level of success in the final year of preschool education (5-6 years old) rises to 12.1% and to 33.3% in the first year of Primary Education (6-7 year old). These differences are statistically significant (Chi-Square =46.1[2]; p<0.01) and the *size effect* may be considered substantially high (Cramer's V = 0.37).

More interestingly, Table 5 details the percentages of correct accomplishment of each of the four categories included in the *LH* test by the educational level of the participants. As already mentioned in the methods section, the two pictures belonging to each category have to be correctly classified in order to consider that a certain category has been successfully completed. Three of the four categories show statistically significant differences among children from different educational levels (*natural phenomena, animal* and *vehicle* categories) but no significant differences have been found in the *plant* category.

Moreover, the pattern of answers expressed by the children in their penultimate year of preschool education fits into a random distribution in the categories of *vehicle* and *natural phenomena* and their responses differ from a random pattern in the *animal* (p<0.001, binomial test) and *plant* (p<0.001, binomial test) categories.

Table 5. The breakdown by educational level of the relative frequency (%) of successful completion of each of the four categories considered in the *Living/Non-living Distinction Test*

Educational level	Categories			
	Phenomena[1]	*Animal*[2]	*Vehicle*[3]	*Plant*
Penultimate year of Preschool Education (4-5 years old)	27.5	72.5	26.8	58.7
Finally year of Preschool Education (5-6 years old)	38.5	90.1	41.8	64.8
First year of Primary Education (6-7 years old)	65.7	93.9	71.7	64.6

(1) Chi-Square =35 [2]; p<0.001; Cramer's V = 0.33
(2) Chi-Square =23.3[2]; p<0.001; Cramer's V = 0.26
(3) Chi-Square =47.5[2]; p<0.001; Cramer's V = 0.38

The participants in the final year of preschool education do not respond to any category randomly (*vehicle* category p<0.001, binomial test; *natural phenomena* category p<0.01, binomial test; *animal* category p<0.001, binomial test and *plant* category p<0.001, binomial test). Finally, the model of responses that the older children express also differs from a random pattern in all the categories (*vehicle* category p<0.001, binomial test; *natural phenomena* category p<0.001, binomial test; *animal* category p<0.001, binomial test and *plant* category p<0.001, binomial test). No significant differences between girls and boys have been found.

3.2. *Environmental Judgement Test* (*EJT*)

The study of the responses of the children to the *Environmental Judgement Test* is detailed herer. Initially the data regarding the dilemmas confronting the environmental and socio-conventional domains is presented and, subsequently, the data related to those that confront moral and socio-conventional domains.

3.2.1. Environmental domain versus socio-conventional domain

On average, the children in the sample consider 3.0 times out of the 4 possible (*SD*=1.2) that actions against plants (environmental domain) are more serious than the transgression of a social rule. To put it differently, 45.7% of the children interviewed considered, in the four dilemmas shown, that the misbehaviour against plants is more negative than transgression of a social rule. Moreover, 25% of the children endorse the same choice in three out of the four dilemmas.

Neither the analysis of the responses by boys and girls, nor those given by children from different educational level, shows any statistically significant differences. In accordance with this, the data of the entire sample may be considered as a whole in order to test whether or not, the pattern of response fits a random distribution.

This analysis clearly indicates that the children's answers differ from a random distribution (Picture 4 *versus* Picture 13, p<0.001, binomial test; Picture 6 *versus* Picture 9, p<0.001, binomial test; Picture 5 *versus* Picture 10, p<0.001, binomial test, and, finally, Picture 8 *versus* Picture 11, p<0.001, binomial test).

3.2.2. Moral domain versus socio-conventional domain

When tackling the four dilemmas confronting moral and socio-conventional domains, on average, the children of the sample studied responded 2.6 times (*SD*=1.2) that behaviour which affects the welfare of others is more serious than breaking social rules with no impact on another's well-being. In this sense, 26% of the children express in the four dilemmas that the presented moral related transgressions are more serious than the

nonobservance of a socially accepted rule. Additionally, 30.8% of the children supported the same opinion in three of the four dilemmas.

No differences have been found regarding the responses given by girls or boys. However, children from different educational levels tend to answer in a different way (Kruskal-Wallis H-test = 23.5 [2], p <0.05, $\eta2$ = .07). Table 6 breaks down the average number of occasions in which children from each of the three educational levels point to the moral related transgressions as the most negative, in comparison with the socio-conventional misconduct.

Table 6. Breakdown by educational level of the statistical descriptors of the number of responses awarding more severity to transgressions related to moral domain rather than to those linked to the socio-conventional domain

	N	Mean	SD	Range
Penultimate year of preschool level (4-5 years old)	138	2.2	1.2	0-4
Final year of preschool level (5-6 years old)	91	2.8	1.1	0-4
First year of primary level (6-7 years old)	99	2.9	1.1	0-4

Regarding the study of the pattern of choice, the data collected in the first year of primary level is statistically different from a random pattern in the four dilemmas posed to the children (Picture 3 *versus* Picture 7, p<0.001, binomial test; Picture 6 *versus* Picture 1, p<0.001, binomial test; Picture 5 *versus* Picture 2, p<0.001, binomial test, and, finally, Picture 8 *versus* Picture 4, p<0.001, binomial test).

On the contrary, the pattern of choice that the youngest children (the penultimate year of preschool level) express in the four dilemmas conforms to a collection of random choices.

The choices of the children in the final year of preschool level differ from a random distribution in three of the four dilemmas (Picture 3 *versus* Picture 7, p<0.001, binomial test; Picture 5 *versus* Picture 2, p<0.001, binomial test, and, finally, Picture 8 *versus* Picture 4, p<0.001, binomial test).

4. Discussion of the results

4.1. Living/Non-living Distinction Test

The data collected from the *Living/Non-living Distinction Test* highlights the tiny proportion of children (less than two in ten) who successfully accomplish the *LH* task. This suggests that the crucial distinction between living things and inanimate entities is a conceptual achievement that is yet to be understood by the majority of the children interviewed. At a more detailed level, seven out of those who successfully complete the task, belong to the group of older children attending the first level of Primary Education (6-7 year-old group).

Linking together, this evidence suggests that it is difficult to assume that an understanding of the foundations of the phenomenon of life can be taken for granted at the beginning of Primary Education. This conclusion is also fully supported by previous research that points out that after their preschool years, children gradually evolve a more accurate distinction between living things and inanimate entities but, also, that the process of achievement of this conceptual notion may hardly be restricted to kindergarten age (MAHERALLY, 2014; MARGETT & WITHERINGTON, 2011; VILLARROEL & INFANTE, 2014; WRIGHT ET AL., 2015).

Furthermore, the responses that children give in each of the four categories posed in the *LH* test, offer additional information regarding the difficulties that young children encounter as they develop the comprehension of what distinguishes living beings from inanimate entities. Thus, it is noteworthy that according to the data presented in Table 5, the largest differences among the answers provided by children in their different educational levels are linked to the *natural phenomena* and *vehicle* categories. This conclusion is supported by the fact that the *size effect* linked to the two mentioned categories are the only ones that reach the 0.3 level (*Cramer's V* is 0.33 and 0.38, respectively) which indicates that there is no less than a moderate association between the variables considered (VOLKER, 2006). Accordingly, the main conclusion to be drawn from these figures is that in the sample analysed, the inanimate entities, such as the sun (showing apparent movement in the sky), clouds (ever-changing entities) or vehicles (objects linked to movement) are less likely to be classified as living things, as the responses given by the older participants are considered.

This observance is in line with previous research that points out the fact that young children largely rely on the apparent movement that entities display with a view to deciding whether they are living things or not. Consequently, young children tend to consider inanimate moving entities as living things or, also, to prevent including plants as living things, precisely due to their apparent

stationary nature (MARGETT & WITHERINGTON, 2011; MARTÍNEZ-LOSADA ET AL., 2014; VILLARROEL & INFANTE, 2014; YOREK ET AL., 2009).

By way of summary, the data presented is consistent with the assumption that over the period from the penultimate year of Preschool Education to the first year of Primary education, children gradually acquire a more precise, but still incomplete, picture about the concept of living things. More specifically, this study supports the idea that children between the ages of 4 and 7 become progressively less prone to consider inanimate moving objects as living things. However, equally important is the conclusion that only a minority of the children may express a full understanding regarding what a living thing is, not least because a substantial proportion of them do not consider plants as living things.

4.2. Environmental Judgement Test

Moving onto the results related to the *Environmental Judgement Test*, the data collected shows the negative reaction that misbehaviour against plant life creates in the children in the sample. Thus, 7 out of 10 children express, on at least 3 occasions amongst the four possible alternatives, that harmful behaviour to plants is more negative than breaking a socially accepted rule. More interestingly, this frequency is irrespective of the educational level and sex of the participants. This evidence is concurrent with previous research (VILLARROEL, 2013) and lends support to the belief, reported by HUSSAR & HORVATH (2011), that young children certainly construct morally-based views about nature, leading them to hold more serious regard for the environment than to arbitrary social rules.

Also prominent in the evidence provided by the *EJT* task is that children in the first year of Primary Education (6-7 year olds) and, to a large extent, those attending the final course of Preschool Education (5-6 year olds) express more severe opinions against transgressions related to the moral domain than to those related to the inobservance of a social rule. Thus, on average, these children express, in almost three out of the four dilemmas, that actions affecting the well-being of others are more negative than the transgression of social conventions. In line with this data, several studies posit that the initial distinction between moral and social judgements arise very early in children's development (HEIPHETZ & YOUNG, 2014; KILLEN & RIZZO, 2014; MARTIN, 2015) and also, that by the time children start their final preschool year (about age 5) they are very capable of balancing competing moral and conventional considerations (SMETANA ET AL., 2014).

Stated briefly, the data provided by the *Environmental Judgement Test* is coherent with the assumption that young children do understand that a respect for plant life, as well as for the well-being of others, prevails over the observance of socio-conventional rules. Additionally, the evidence provided lends weight to the idea that young children judge actions influencing the environment by means of a distinctive normative domain, which is separated, at least, from that involved in the understanding of social agreements and norms (HUSSAR & HORVATH, 2011).

5. Conclusions

The difficulties of differentiating living things from non-living entities expressed by the children in both the present study and also, previous research (VILLARROEL, 2013), does not support the belief that the severity that young children express regarding hazardous conduct towards plant life might be a consequence of some kind of rational reflection founded upon their understanding of biological notions. On the contrary, the data presented is more in line with the assumption that when tackling environmental *versus* social dilemmas, young children's choices bear little relationship to their conceptual development in the biological domain. This point leads to the consideration that in early childhood the emergence of appraisals of actions influencing the environment precedes the comprehension of significant key biological concepts, such as an understanding of what makes living things distinguishable from inanimate entities.

If so, and excluding the possibility that children may answer randomly, as previously has been in evidence, one may reflect on the issue of what sustains the pattern of responses found. In other words, if young children's conceptual development in the biological domain does not provide support for their judgements involving the environment, what encourages young children to be distinctly more inclined to recognise actions against plants as more negative than the nonobservance of social rules?

This alone prompts us to consider the question of what the basis of ethical judgements is. Historically, moral psychology has emphasised the fact that the development of cognitive abilities spurs moral reasoning towards higher stages of sophistication (PIAGET, 1932; KOHLBERG, 1963; TURIEL, 1983). In the last decade, however, a new paradigm emerging from studies in the field of

affective science is dramatically changing the view that we have on the topic of moral decision making (Helion & Pizarro, 2014; Leavitt et al., 2015). According to this new paradigm, referred to as *moral intuition*, the primordial source of ethical judgement is not conscious deliberation, or rational thinking, but a set of emotionally-driven processes occurring tacitly on the brink of conscious awareness (Haidt, 2001). More interestingly, the moral intuition paradigm states that ethical judgements resemble aesthetic-like appraisals in such a way that when grappling with moral dilemmas, individuals spontaneously ponder the inappropriateness of any moral related transgression well before the rational reflection may become apparent (Haidt & Bjorklund, 2008). Speculation is that *moral intuitions* play a significant role in the support of social well-being, not least because they enable communities to prevent transgressions from occurring against essential rules such as, *to prevent members of the community from harming others,* or *indeed committing murders* (Szekely & Miu, 2015).

The moral intuition paradigm offers a suitable theoretical framework to understand the results drawn from this study. Thus, the statistically significant option that young children make in the sense of attaching more severity to actions that pose a threat to plant life than the transgressions of social norms, may well fit into a pattern of sudden, rationally unfounded and emotionally-driven responses. This is particularly the case when considering that the children in the sample, as a whole, tackle the environment versus socio-conventional dilemmas in the absence of a sound conceptual understanding of such a key biological concept as the notion of living things. This point, as a conclusion, suggests that emotions, anticipating the biological understanding itself, drive the construction of ethical concerns for nature in early childhood.

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