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RESEARCH ARTICLE

The More I Can Choose, The More I Am Disappointed: The "Illusion of Control" in Children's Decision-Making

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Abstract:

Background:

Decision making is a complex psychological process driven by emotions. Among the most unpleasant ones are the situations when the obtained outcome is not the one expected. This emotional experience is influenced by sense of agency, *i.e.* the feeling that we voluntarily control our actions and, through them, events in the world. Negative counterfactual emotions as disappointment have been marginally analyzed in children's decision-making, and the study of children's sense of agency could help to understand them.

Objective:

To evaluate during childhood the valence of disappointment in decision making in relation to the possibility of choosing or not.

Method:

107 children (age range 7-10 years) rated their emotions before and after discovering the outcome, in two experimental conditions: choice condition, where the child could decide which of the two remaining tickets to choose in order to win some candies, and no choice condition, where the child could not decide as only one ticket was left.

Results:

The self-attribution of a positive emotional state was significantly higher in the choice condition than in the no choice condition, so the possibility to pick up the ticket made children happier in general, by promoting an "illusion of control", which is absent in the no choice condition. Then, after discovering the bad outcome, the emotions collapse, settling at substantially similar values.

Conclusion:

Children have experienced a sense of agency for their choice, thus leading to an illusion of control for the decision process and to the so-called "wishful thinking".

Keywords: Sense of agency, Illusion of control, Disappointment, Decision making, Child development.

1. INTRODUCTION

Decision making is a complex psychological process, involving both deliberative and emotional components. For a long time, decision making has been conceived as a primarily cognitive process, requiring to estimate which among

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various options would have led to the best outcome, *i.e.* the maximization of one's own profit. This conception has been supported by another one, deeply rooted in our western culture, *i.e.* the negatively interfering role of emotions (or "passions") on human behavior. Such a conception has been strongly revised over the past decades, that have showed an increase of researches about the role of emotions in decision-making [1, 2].

It is possible to distinguish between two main ways in which emotions are involved in decision-making. The first one regards expected emotions, *i.e.* the predictions about the emotional consequences of a certain outcome after the decision. The second one regards immediate emotions, *i.e.* the feelings that people experience during the decision-making process. Nowadays, in the psychological scientific literature there is a remarkable agreement on the role of emotions as powerful drivers of human decision-making across all its phases, *i.e.* before making the decision, during the decisional process and at the end, once the results of the decision are discovered.

Among the most unpleasant emotional experiences in decision making we can find the situations when the obtained outcome is not the one we expected. In this case, we experience emotions such as regret and disappointment that typically occur when we compare the actual outcome with other possible outcome/s that could have occurred had we only decided differently [3]. Regret and disappointment are close to each other, because their hedonic valence is the same (*i.e.* negative), but with a different intensity [4, 5]. What makes the distinction between the two emotions possible is the differential agency attribution, *i.e.* personal agency for regret and external agency for disappointment [6].

Sense of agency is a key psychological component of human behavior, as it refers to the feeling that we voluntarily control our actions and, through them, events in the world [7]. So, sense of agency is relevant for decision making, as it allows us to establish a link between our intentions and our actions, and between our actions and their final outcomes. This second link, between actions and outcomes, constitutes an important signal that informs the sense of agency, because if outcomes match our expectations, our sense of agency is reinforced (the feeling that "I did that"), whereas a mismatch impoverishes our sense of agency [8, 9]. However, people often tend to overestimate their sense of agency, thus falling in the bias of the so-called "illusion of control" [10], *i.e.* the tendency to believe that they can control or at least influence outcomes that they undoubtedly have no influence over. This unrealistic perceived control of events that cannot be under our control is evident in decision making, for example when people prefer to pick their lottery numbers than have them randomly allocated, and are willing to even pay for such an opportunity, or when rolling dice in craps, as they tend to throw harder for high numbers and softer for low numbers. This illusion is so pervasive that it lays at the heart of superstitious thinking also in the adult world. As regards the development of the sense of agency, researches have shown that young children present a reduced awareness about the possibilities to determine outcomes through actions, and that this altered sense of agency drives them easily towards the illusion of control [11, 12]. The valence of the outcome plays a role as well, as young children tend to consider an outcome as intended when it satisfies their desire [13], and it has been also shown that the valence of the outcome drives children's judgements and decisions in bargaining games - see for example [14 - 16].

So, as regards counterfactual emotions such as regret and disappointment, it may be that children do not truly experience them, but rather a negative feeling related to the frustration of not obtaining a desired outcome. A crucial point here is the understanding of agency as a necessary condition to experience such type of emotions: [17] showed that children that experience regret made a different decision the day after in the same task, but this remained true independent of who was responsible for the choice, *i.e.* the child, a dice, a dice launched by another person. However, if children themselves decided, *i.e.* they did not use a dice nor let another person use it, the intensity of the emotion was higher. This result is interesting, because it puts the light again on the role of the sense of agency in the emotions involved in decision making.

As regards disappointment, to the best of our knowledge, so far only one study has explored it: [18] showed that around seven/eight years of age children understand the different situational antecedents of regret and disappointment, but they are still not able to adopt adequate strategies in order to manage anticipatory regret and anticipatory disappointment until nine/ten years.

We think that the study of children's sense of agency and of the possible presence of the bias of the "illusion of control" could contribute to the understanding of counterfactual emotions in decision making, especially of disappointment, that has been marginally studied in developmental decision making so far. The emotion of disappointment, in fact, should not be influenced by the understanding of one's own responsibility as in the case of regret, so it should simply depend on the bad outcome of the decision irrespective of whether the subject had the opportunity to choose or not. So, the aim of this study is to evaluate the valence of disappointment in relation to the

possibility of choosing or not, and the different ratings of this emotion at various moments of the decision-making process, *i.e.* before making a choice, after making the choice but not knowing the outcome, and after knowing the (bad) outcome.

2. MATERIAL AND METHODS

2.1. Participants

The participants were 107 children attending the 2nd, 3rd, 4th, 5th years of a primary school in the North of Italy. They were neither referred to social services, nor reported for learning and socio-relational difficulties. Parents' informed written consent was obtained for each participant, and directors of the schools granted permission to carry on the research.

The research was conducted according to APA ethical standards, and was approved by the local ethics committee. The study was conformed to the ethical principles of the 1964 Helsinki Declaration.

In order to create a homogeneous group under the cognitive and the linguistic profile, the Coloured Progressive Matrices – CPM [19] and the Peabody Picture Vocabulary Test – PPVT [20] were respectively used. On the basis of this assessment, nine children (3 strangers and 6 Italians) were excluded from the sample since their performance to the CPM resulted at the 25th percentile.

Two age-groups were created: young (2nd and 3rd classes, N = 54, 19 males, 35 females) with a mean age of 7 years and 7 months (sd = 6.95 months), and old (4th and 5th classes, N = 44, 21 males, 23 females) with a mean age of 9 years and 9 months (sd = 8.23 months).

2.2. Procedure

A simple decision making task was created for the purposes of the present study. The scenario was derived from [21], adjusted for children. The experimenter explained that the children would play an amusement-park lottery, where he/she can win some candies (good outcome = 10 candies; bad outcome = 1 candy). The task included two conditions. In the choice condition, the child could decide which of two remaining tickets to choose in order to win some candies. In the no choice condition, the child could not decide which ticket to choose as another child had decided first, and so they would receive the remaining ticket.

In both contitions the outcome was always bad (one candy), and the child was asked to rate his/her emotions on a thermometer ranging from 1 (negative/bad feelings) to 7 (positive/good feelings) with smiles depicted on it. Adequate understanding of the emotion thermometer was assessed before the administration of the task.

The child was asked to rate his/her emotions across the entire decision process, *i.e.* at three levels:

- level 1: before making the decision (in the choice condition) and before being given the remaining ticket (in the no choice condition).
- level 2: when having the ticket in his/her hands, but before discovering the outcome.
- level 3: after discovering the outcome.

Tasks were submitted individually in one session in a quiet room at school. Each child played the two tasks, i.e. the choice task and the no choice task as a within subjects design. The order of the two task conditions was counterbalanced across subjects.

3. RESULTS

Since preliminary analyses showed no statistically significant difference between the level 1 and level 2 in both experimental conditions ($p > .05$), an average score between the self-attribution of positive emotional state at level 1 and level 2 was computed, both for the choice condition and for that of no choice condition. From a descriptive overview (Table **1**), the means of the emotions before discovering the bad outcome in the choice condition are higher than the means of the emotions before discovering the bad outcome in the no choice condition in both age groups. Paired samples T-tests confirm this trend: the self-attribution of a positive emotional state is significantly higher in the choice condition than in the no choice condition (young: paired samples $t=7.26$, $df=48$, $p < .001$; old: $t=6.93$, $df=48$, $p < .001$). This may suggest that the possibility to pick up the ticket could make children happier in general, by promoting an "illusion of control", which is absent in the no choice condition. Then, after discovering the bad outcome, the emotions

collapse, settling at substantially similar values, independently of the experimental condition for both age groups.

Table 1. Descriptive statistics of the explored variables.

	N	Min	Max	Mean	Stand. Dev.
CC[1]- emotion before outcome	98	3,00	7,00	5,99	,84
NCC[2] - emotion before outcome	98	2,50	7,00	4,92	,98
CC[1] - emotion after outcome	98	1	7	2,19	1,21
NCC[2] - emotion after outcome	98	1	7	2,09	1,23

1 Choice Condition2 No Choice Condition

In order to better understand if children experience different intensity of emotions – namely disappointment – between the choice and the no choice conditions, we calculated the relative difference between the self-attribution of a positive emotional state before and after discovering the bad outcome for the choice condition and for the no choice condition separately. These two differences should be the measure of the intensity of the effect that the bad outcome has on the initial emotion in the two different conditions, *i.e.* in the choice condition and in the no choice condition.

We ran a General Linear Model for repeated measures comparing the indexes of the intensity of emotions, *i.e.* the choice difference and the no choice difference, as dependent variables, and age and gender as between-subject factors.

We found a significant main effect of the experimental condition ($F_{(1, 94)} = 88.88$, $p = .001$, $\eta\rho^2 = .486$, $\theta = 1$), showing that the initial condition, *i.e.* having or not having the possibility to choose, drives the intensity of the effect that the bad outcome has on the initial emotion. In the choice condition, in fact, the initial ratings of emotions are higher than in the no choice condition, so the final difference between the ratings of emotions at two points of the decisional process is higher than the final difference in the no choice condition. This evidence seems to support the idea that children fall into the bias of the "illusion of control". In fact, the sense of agency may have played a role in this experience: the possibility to choose the ticket seems to sustain the emotional rates at the beginning of the decision making process, thus making children happier compared to the situation with no possibility to choose.

DISCUSSION AND CONCLUSION

The understanding of complex emotions involved in decision-making is a challenging achievement during childhood. With regard to the understanding of negative emotions such as disappointment, our results show that children between seven/nine years of age experience different intensity of this emotion based to the possibility of choosing or not. Our findings are in line with those reported by [18] about disappointment, but we cannot claim anything about the way children use this emotion, as we did not directly evaluate the anticipation of such emotion and the use of such anticipation on subsequent decision-making as did [18]. Instead, we tried to examine the intensity of the emotional experience across the decision-making process, *i.e.* immediate emotions or the feelings that people experience during the decision-making process, following the distinction proposed by [1]. Monitoring children's ratings of emotions at various points of the decisional process has offered a relevant result, which can be explained by referring to the function of agency, analogous to what happens in adults [6]. Notably, the difference in the ratings of the emotions before and after knowing the outcome is higher in the choice condition than in the no choice condition, and this can be likely explained by referring to the antecedent condition of the decision itself. Children have presumably experienced a sense of agency for their choice, thus leading to an illusion of control for the decision process and to so-called "wishful thinking". This likely raised the level of the emotions until the moment of the discovery of the bad outcome: the higher the emotions before knowing it, the higher the difference between "before" and "after" the decision. However, we did not find an age effect, as found by [12], and this could be probably attributed to the different research paradigms used in the two studies.

The illusion of control seems to be quite pervasive of human behavior and hard to be eliminated also in adults, as demonstrated by [22]: their participants were exposed to undesired outcomes that occurred independently of their behavior, and they were warned that the outcomes might have alternative causes, other than the participants' actions, a strategy that has been shown to reduce positive illusions. However, when participants received this information in an experiment in which the outcomes were undesired, their illusion was enhanced rather than reduced.

This study has also some limitations. In order to be sure that all children – especially younger ones – understood the request to rate the intensity of their emotion at various moments of the decisional process, we used the thermometer of emotions, without asking to label them. So, we found that the participants completed the emotional state scale

differently when they had the possibility to choose their ticket vs. when they had not, thus showing that the possibility to choose influences the subsequent emotional experience. However, we do not have the report about the precise labelled emotion (disappointment), that could also have been mixed with other ones (such as anger, or sadness). Future research could consider to use a post-manipulation measure that potentially captures, *via* self report, what the participants are exactly feeling, in order to better understand the development of decision-making abilities and of the emotions involved in these complex processes.

FUNDING

This study received no funding.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

INFORMED CONSENT

Parents' informed written consent was obtained for each participant before starting the research.

The directors of the schools granted permission to carry out the research. The research was conducted according to APA ethical standards, and was approved by the local ethics committee. The study was conformed to the ethical principles of the 1964 Helsinki Declaration.

CONFLICT OF INTEREST

The author confirms that this article content has no conflict of interest.

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REFERENCES

[1] Loewenstein G, Lerner JS. Davidson RJ, Scherer KR, Goldsmith HH. The role of affect in decision making. In: Handbook of Affective Science. Oxford University Press 2003; pp. 619-42.

[2] Lerner JS, Li Y, Valdesolo P, Kassam KS. Emotion and decision making. Annu Rev Psychol 2015; 66: 799-823. [http://dx.doi.org/10.1146/annurev-psych-010213-115043] [PMID: 25251484]

[3] Coricelli G, Dolan RJ, Sirigu A. Brain, emotion and decision making: the paradigmatic example of regret. Trends Cogn Sci (Regul Ed) 2007; 11(6): 258-65. [http://dx.doi.org/10.1016/j.tics.2007.04.003] [PMID: 17475537]

[4] Zeelenberg M, Van Dijk WW, Manstead AS, *et al.* On bad decisions and disconfirmed expectancies: The psychology of regret and disappointment. Cogn Emotion 2000; 14: 521-41. [http://dx.doi.org/10.1080/026999300402781]

[5] Van Dijk E, Zeelenberg M. Investigating the Appraisal Patterns of Regret and Disappointment. Motiv Emot 2002; 26: 321-31. [http://dx.doi.org/10.1023/A:1022823221146]

[6] Giorgetta C, Grecucci A, Bonini N, *et al.* Waves of regret: a meg study of emotion and decision-making. Neuropsychologia 2013; 51(1): 38-51. [http://dx.doi.org/10.1016/j.neuropsychologia.2012.10.015] [PMID: 23137945]

[7] Haggard P, Chambon V. Sense of agency. Curr Biol 2012; 22(10): R390-2. [http://dx.doi.org/10.1016/j.cub.2012.02.040] [PMID: 22625851]

[8] Blakemore SJ, Wolpert DM, Frith CD. Abnormalities in the awareness of action. Trends Cogn Sci (Regul Ed) 2002; 6(6): 237-42. [http://dx.doi.org/10.1016/S1364-6613(02)01907-1] [PMID: 12039604]

[9] Wegner DM, Wheatley T. Apparent mental causation. Sources of the experience of will. Am Psychol 1999; 54(7): 480-92. [http://dx.doi.org/10.1037/0003-066X.54.7.480] [PMID: 10424155]

[10] Langer EJ. The illusion of control. J Pers Soc Psychol 1975; 32: 311-28. [http://dx.doi.org/10.1037/0022-3514.32.2.311]

[11] Weisz JR, Yeates KO, Robertson D, *et al.* Perceived contingency of skill and chance events – A developmental analysis. Dev Psychol 1982;

18: 898-905.
[http://dx.doi.org/10.1037/0012-1649.18.6.898]

[12] van Elk M, Rutjens BT, van der Pligt J. The development of the illusion of control and sense of agency in 7- to-12-year old children and adults. Cognition 2015; 145: 1-12.
[http://dx.doi.org/10.1016/j.cognition.2015.08.004] [PMID: 26298422]

[13] Astington JW. The paradox of intention: Assessing children's metarepresentational understanding. In: Malle BF, Moses LJ, Baldwin DA, Eds. Intentions and intentionality: Foundations of social cognition. MIT Press 2001; pp. 85-103.

[14] Castelli I, Massaro D, Sanfey AG, *et al.* Fairness and intentionality in children's decision-making. Int Rev Econ 2010; 57: 269-88.
[http://dx.doi.org/10.1007/s12232-010-0101-x]

[15] Castelli I, Massaro D, Sanfey AG, *et al.* "What is fair for you?" judgments and decisions about fairness and theory of mind. Eur J Dev Psychol 2013; 11: 49-62.
[http://dx.doi.org/10.1080/17405629.2013.806264]

[16] Castelli I, Massaro D, Bicchieri C, Chavez A, Marchetti A. Fairness norms and theory of mind in an ultimatum game: judgments, offers, and decisions in school-aged children. PLoS One 2014; 9(8): e105024.
[http://dx.doi.org/10.1371/journal.pone.0105024] [PMID: 25118863]

[17] OConnor E, McCormack T, Beck SR, Feeney A. Regret and adaptive decision making in young children. J Exp Child Psychol 2015; 135: 86-92.
[http://dx.doi.org/10.1016/j.jecp.2015.03.003] [PMID: 25843700]

[18] Guttentag R, Ferrell J. Children's understanding of anticipatory regret and disappointment. Cogn Emotion 2008; 22: 815-32.
[http://dx.doi.org/10.1080/02699930701541542]

[19] Raven JC. Progressive matrices: Séries A, Ab, B Clamart Seine: Editions scientifiques et psychotechniques 1947.

[20] Dunn L, Dunn L. Peabody Picture Vocabulary Test-Revised Manual. Pines, MN: American Guidance Service 1981.

[21] Van Dijk E, Zeelenberg M. On the psychology of 'if only': Regret and the comparison between factual and counterfactual outcomes. Organ Behav Hum 2005; 97: 152-60.
[http://dx.doi.org/10.1016/j.obhdp.2005.04.001]

[22] Matute H, Blanco F. Reducing the illusion of control when an action is followed by an undesired outcome. Psychon Bull Rev 2014; 21(4): 1087-93.
[http://dx.doi.org/10.3758/s13423-014-0584-7] [PMID: 24448764]