

# Decision Making and Moral Judgment in Adolescents and Young Adults

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## Abstract

**Introduction:** Decision-Making (*DM*) is a process aimed at selecting one or more response options, while Moral-Judgment (*MJ*) is defined as the evaluation decision through which the agent approves or disapproves of intentional actions in which physical and/or psychological harm is caused to the people. Social cognition tries to study the bases of human development of DM and MJ as a dual process, where cognition and emotion jointly participate. **Objective:** The objective of this study was the evaluation of DM and MJ in adolescents and young adults. **Methodology:** The Columbia Card Task (Figner et al., 2009), which evaluates DM, and Young's Moral Judgment task (Baez et al., 2015), were used to evaluate MJ. **Results:** The results of the study suggest that adolescents take greater risk than young adults in the DM in emotional and cognitive tasks, even increasing the risk in their choices in the cognitive task compared to the emotional task. Regarding the MJ, adolescents consider the negative consequences of a positive action inappropriate even though there is no intention to cause harm, their reaction being more emotional. Regarding young adults, they consider a negative action inappropriate when there is a clear intent to cause harm, despite the fact that the consequence is not negative, their reaction being more reasoned. **Conclusion:** These results allow for an evaluation of DM and MJ in a comprehensive way, taking into account that in everyday life both emotion and cognition interact to carry out a choice both in adolescence and in young adulthood.

## Keywords

Decision Making, Moral Judgment, Adolescents and Young Adults

## 1. Introduction

Decision making (*DM*) is a fundamental process for life both in individual and collective aspects. Much of what human beings do on a day-to-day basis involves making decisions. The modern theories that have emerged for the study of *DM* have been developed since the second half of the 20th century thanks to the contribution of various disciplines such as psychology, economics, statistics, politics, sociology and philosophy (Wilson & Keil, 1999). Likewise, it is important to recognize that although these approaches are not unified and there are various ways of studying and analyzing *DM*, what they agree on is that it is a process aimed at selecting one or more options (Utami, 2018; Hansson, 2005), as a complex process that involves several cognitive and emotional functions (Medina et al., 2022; Alsharif et al., 2021; Hansson, 2005) and in which the level of complexity could be associated with the level of consequences that come with the decision (Sanfey & Rilling, 2011).

More specifically, from a cognitive point of view, *DM* is the process of deliberately choosing a preferred option or a course of action among a set of alternatives, which affects most aspects of daily life (Ernst & Paulus, 2005; Wilson & Keil, 1999) and requires the participation of different cognitive functions, in order to obtain a positive or advantageous consequence. On the other hand, to neurosciences this process refers to choosing and acting at a certain moment, so that it implies a reasoned free choice, which is mainly related to the activity of the prefrontal areas of the central nervous system (Fuster, 2003). It can also be defined as the ability to select the most adaptive course of action for the organism among a set of possible behavioral alternatives, associated with different neural networks of various brain areas (Bechara et al., 2000). Damasio (1996) has recognized an emotional component in *DM*, which is activated in relation to the analysis of possible consequences (somatic marker).

On the other hand, moral judgment (*MJ*) is a capacity that allows decisions to be made in the social sphere, specifically based on the internal principles and values of each person (Kohlberg, 1969). In this sense, *MJ* can be defined as the evaluation decision through which the agent approves or disapproves of intentional actions that cause physical and/or psychological harm to one or more people (Tovar, 2013). The *MJ* has been studied from cognitive psychology and social neurosciences by different authors (Guerrero, 2000; Greene et al., 2001; Kohlberg, 1969; Lind, 2000; Rest, 1979; Young et al., 2010; Young et al., 2007), who try to approach social decision-making through moral behavior and the principles that support such ideas, integrating emotional and cognitive components in the process of an election. For this, they have used different methods and techniques, among which the Greene et al. (2008) model stands out, who proposes that for *DM* with a social component, it is necessary to resort to the study of moral behavior, which he considers as a dual process in which emotions and cognition participate in the production and issuance of moral judgments.

Throughout development, it is expected that, as the person approaches ado-

lence and young adulthood, a development of the DM process beyond the superficial is shown, however, there are studies that indicate that the adolescent continues to make decisions with greater impulsivity compared to young adults (Helfinstein et al., 2012; van Hoorn et al., 2018; Spear, 2010). Impulsive behaviors in adolescents could be a product of the relatively late maturation of the prefrontal cortex (PFC), even in some young people there is little maturation in regions related to cognitive control, modulation of activity, and rewarding emotional processing (Spear, 2010). Furthermore, although inhibitory control is present since childhood, it is one of the executive functions that continues to develop during adolescence and even in youth, and which is also involved in TD (Leon-Carrion et al., 2004). Throughout life, not only the cognitive and physiological aspects change, but also the cultural and social ones, so that the learning and development of TD in general and of JM in specific, can manifest themselves in a different way in each of the people when they pass these ages, adolescence and youth, which are usually called critical stages of human development (Garcés et al., 2019; Maree, 2018).

The above is evidenced in studies in which TD has been assessed in adolescents and young adults. Hooper et al. (2004) evaluated two cognitive components that from their perspective are involved in decision-making (working memory—digits—and inhibitory behavior—Go/No Go task) in addition to analyzing TD in risk conditions (Iowa Gambling Task) in adolescents (9 - 17 years). The results showed that there are no significant differences in both sexes in the three tasks applied, but there are cross-sectional changes related to age. The younger the age, the greater the cognitive difficulty in making decisions, inhibiting behaviors and in working memory (Hooper et al., 2004). The authors point out that the frontal lobes, especially the ventromedial PFC, are in process of maturation during adolescence and continue into adulthood. Similarly Burnett et al. (2010) applied the Iowa Gambling Task to men of various age groups (20 children: 9 - 11 years, 26 adolescents: 12 - 15 years, 20 late adolescents: 16 - 18 years, and 17 adults: 18 - 25 years) to observe the development of the execution in said task. They found that the ability to make fewer risky decisions improved with age. However, 14-year-old adolescents presented a higher risk when making decisions than children from 9 to 11 years of age. This suggests that there is an increase in risky behaviors in early adolescence, compared to childhood, late adolescence, and young adulthood.

Another task used to assess DM in risk situations is the Columbia Card Task (CCT) (Figner & Voelki, 2004), which distinguishes the involvement of affective processes from cognitive ones through two versions: one with feedback (emotional) and another without feedback (cognitive). Figner et al. (2009) applied this test to two groups of adolescents (13 - 16 years and 17 - 19 years) and adults, found that the participants of both groups tend to make riskier decisions in the affective version (~24 cards) than in the cognitive one (~12 cards). This could be explained by a double system in risk taking, as a result of the competition between the affective processes that tend to cancel the system of cognitive

processes in a state of greater emotional arousal in adolescents. In adults (18 - 45 years old) the cards turned over in the cognitive version are 11.9 ( $\pm 4.97$ ) and in the affective version it is 9.63 ( $\pm 2.69$ ) with significant differences between them, but without correlation between the age of the participants and their task performance (Buelow & Blaine, 2015).

On the other hand, Majluf (1986) reported the use of the “Socio-moral Reflection” test proposed by Gibbs et al. (1984) for the development assessment of the MJ in Peruvian adolescents and adults. In this test, moral dilemmas are presented that must be answered using a multiple choice format. The author points out that the purpose was to observe the evolution of Kohlberg’s (1992, 1969) model of moral development, which postulates the cross-cultural universality of the evolution of MJ in a sequence of stages and increases with age. The attained results showed changes and gradual increases in the stages, specifically, the older the participants, the greater the awareness of moral judgment.

Currently, one of the most widely used tasks for the behavioral assessment of moral judgment, and its brain activation, is the test proposed by Young et al. (2007) in which the participant is asked to indicate how appropriate is a hypothetical situation in which there are two participants: one of them has a belief (neutral or negative) that leads him to act and hence the situation has a resolution (neutral or negative) that affects the other participant. Combinations of two beliefs and two outcomes make four situations possible, for example: “Grace and her friend are visiting a chemical plant. Grace goes to the coffee machine and her friend asks for some sugar.” The four resulting situations are: 1) Grace sees a jar of white powder marked as toxic and thinks that the white powder is toxic; the dust is toxic and her friend dies, it is a negative belief and a negative outcome. 2) Grace sees a jar of white powder marked toxic and thinks that the white powder is toxic; the powder is sugar and her friend is fine, this is a negative belief and a neutral outcome. 3) Grace sees a jar with white powder marked as sugar and thinks that the white powder is sugar; the powder is toxic and her friend dies, it is a neutral belief and a negative result. 4) Grace sees a jar with white powder marked as sugar and thinks that the white powder is sugar; the powder is sugar and her friend is fine, this is a neutral belief and outcome. In this task, the adult participants indicate that situations with negative beliefs and negative consequences are morally more inappropriate than neutral ones, additionally, it is distinguished that the negative result is judged more severely than the neutral one, even though the belief had been neutral. Additionally, Young et al. (2007) reported greater activation of the right temporoparietal junction when listening to moral dilemmas vs. non-moral stories, a region that has previously been associated with the detection of beliefs.

This task has been used in a Latin American context by Baez et al. (2016) to evaluate patients with frontotemporal dementia, frontal cerebral infarction and control participants, all of them from Argentina. Faced with each dilemma, the situation must be evaluated on a Likert scale from 1 (inappropriate) to 7 (appropriate) while in the original task the scale was from 1 to 4 (Young et al.,

2007). The authors found that all participants clearly rated congruent situations: neutral belief with a neutral outcome is appropriate (~5) and negative belief with a negative outcome is a totally inappropriate situation (~1). In non-injured participants when the belief was neutral with a negative outcome causing accidental harm, the situation was rated moderately appropriate (~3.5), while where the belief was negative with a neutral outcome in which an intent to harm was not achieved, it was assessed as inappropriate (~1). On the other hand, the patients of both groups assessed the latter situation liberally, qualifying it as moderately appropriate (~3), in addition, the patients with frontotemporal dementia evaluated the accidental damage situation more rigorously (~2.5). Additionally, these results support the idea of the importance of the participation of the prefrontal cortex, mainly ventral, for the issuance of adequate moral judgments.

It is important to mention that, although no studies with adolescent participants using the Young et al. (2007) task were found, we consider that it is a useful task to assess the evaluation of moral judgments, mainly by observing the incongruent conditions between the belief and the result. In general, previous studies indicate that, at an older age, fewer risky decisions are made and there is better performance in MJ tasks. Therefore, the purpose of this study was to compare the performance of adolescents and young adults in tasks that assess DM considering cognitive, emotional, and social aspects. For this, the CCT task was used with its two versions (cognitive and affective) (Figner & Voelki, 2004) and a moral judgment task by Young et al. (2007). According to the antecedents, it is expected that young adults present better execution (fewer cards turned over) in the emotional version of the CCT than adolescents, but that there will be no difference between the groups in the cognitive version (Figner et al., 2009).

In the moral judgment task we assume that development is not the same between adolescents and young adults; therefore, it is expected that the latter evaluate as less appropriate those situations in which the beliefs were neutral, but with negative consequences—accidental damage—compared to those in which there was no damage, and that they judge as inappropriate the intent to harm that implies a negative belief but a neutral outcome, while this may be different in adolescents (Baez et al., 2014).

## 2. Methodology

### Participants

105 participants divided into two groups were evaluated: 51 adolescents from 13 to 18 years of age (25 women and 26 men) and 54 young adults from 19 to 24 years of age (26 women and 28 men). The mean age of adolescents is 16 ( $\pm 1.73$ ) years and the average schooling is 10 years ( $\pm 0.77$ ), which is equivalent to the first year of high school or its equivalent. While, for young adults, the mean age is 22 ( $\pm 1.86$ ) years and for schooling the mean is 15 ( $\pm 0.60$ ) years, which is equivalent to the third year of university. All participants were without the presence of self-reported psychiatric and neurological diseases. The participants

were recruited from different educational institutions: secondary schools, high schools, and academic units of the Autonomous University of the State of Morelos, Mexico, all of them from the public educational sphere of the city of Cuernavaca, Morelos, using convenience sampling.

### Instruments

An interview prepared for the purposes of the research itself was applied to rule out or confirm neurological or psychiatric history in the participants. Two instruments were applied, one to evaluate DM with a cognitive and emotional component, and another to evaluate MJ. For the DM, an adaptation of the CCT (Figner & Voelki, 2004) was carried out since the original test is computerized. The original test consists of a “game” where a total of 32 cards are placed on the computer screen, arranged in four rows and eight columns. The test allows the evaluation of the cognitive aspect where the participant does not receive immediate feedback on the consequences (losses and gains) of their choices; the emotional version includes immediate feedback on the choices (a happy face when winning or a sad face when losing) in this way there is a greater commitment to emotional processes (Figner et al., 2009). A total of 24 trials are carried out for the emotional version and 24 more for the cognitive version, making it a total of 48 trials. The instruction is to flip as many cards as you want and stop whenever you want, remembering that the happy faces will make you win and the sad faces will subtract points. A greater number of cards turned up means a greater risk taken. A score is obtained for each version and thus, the difference in execution between one process and another is analyzed. For this research, a pencil and paper version was applied, which was piloted in the adolescents (8, mean age = 16 years) and young adults (6, mean age = 21 years) populations; In the emotional version, adolescents flipped an average of 11 cards, and young adults selected 6 cards, while in the cognitive version, adolescents flipped an average of 13 cards, and young adults flipped 6, as the scores obtained were similar to the original version, the implementation of the pencil and paper version was considered adequate.

The second task was that of Young’s Moral Judgment (2007, 2008, 2009, and 2010) which was adapted to the Latin American context by Baez et al. (2015, 2016). The task allows to evaluate the level of development of the MJ in a context of social interaction through the exposure of a situation where an action with a negative or neutral belief is manifested in combination with the result of said action, which can also be neutral or negative. Due to this design, four belief-outcome combinations are presented: neutral-neutral (no intent to harm, and the consequence is neutral), neutral-negative (no intent to harm, however the outcome is harmful), negative-neutral (there is an intention to harm, however, the consequence is neutral) and negative-negative (there is an intention to harm and the result is harmful). Of each combination, 6 trials are applied, which makes a total of 24 situations that are morally evaluated through a Likert-type scale that goes from 1 to 7, where 1 is totally inadequate and 7 totally adequate. The conditions allude to a level of development of MJ in the subject and the DM in its social

component. This questionnaire has been used in the Latino context, achieving similarities with the original test (Baez et al., 2016; Young, Nichols, & Saxe, 2010).

### Procedure

Prior to the implementation of the instruments, informed consent was read and authorized (for adults and for parents of adolescents). The instruments were applied to the participants, which were mostly evaluated in the facilities of the Central Library of the UAEM, with adequate space and environmental conditions for this purpose. Its application lasted approximately 40 to 60 minutes per participant. The application was done in a counterbalanced way to avoid a fatigue effect, which according to Vogt and Johnson (2011) is an added control technique to add internal validity to the results, later the corresponding statistical analyzes were carried out in the SPSS processor. The study was endorsed by the research ethics committee of the Center for Transdisciplinary Research in Psychology (*CITPSI*) of the Autonomous University of the State of Morelos (*UAEM*).

### Data Analysis

The normality of the data obtained in both instruments was assessed and since this assumption was not met, non-parametric analyzes were performed. For the number of card selections turned over from the CCT, the Mann-Whitney U test was applied to compare the groups (adolescents and young adults) for each condition (emotional and cognitive). To obtain the scores for the MJ questionnaire, the average of the Likert scale of the six dilemmas corresponding to each of the four conditions was obtained. The Mann-Whitney U test was also applied to compare the groups in each of the conditions (neutral-neutral, neutral-negative, negative-neutral and negative-negative). Statistical significance was determined with a probability of error of less than 5% ( $p < 0.05$ ) and the effect size was calculated with the Hedges'  $g$  statistical test, since these were non-parametric data with the following interpretation  $>0.2 =$  small;  $>0.5 =$  Medium;  $>0.8 =$  Large.

## 3. Results

Regarding the results of the implementation of the Columbia Card Task, **Table 1** shows the number of selections made by the participants in each condition. It was found that, in both the emotional and cognitive tasks, the mean of selections is significantly higher in adolescents compared to young adults. The effect size is large in both comparisons, although it is double in value for cognitive condition.

Regarding the results of Young's Moral Judgment questionnaire, **Table 2** shows the mean of the four test conditions. In the neutral-negative and negative-neutral conditions, there was a significant difference between adolescents and young adults. There was no significant difference between both groups in the neutral-neutral and negative-negative conditions. In the neutral-negative condition, adolescents obtained lower means compared to young adults, while in the negative-neutral condition adolescents obtained a higher mean compared to



**Table 1.** Mean number of cards turned over in each task in each condition, for each group; the greater the number of cards turned over, the greater the risk in decision making.

Variables	Adolescents n = 51		Young Adults n = 54		<i>U</i>	<i>p</i>	Hedges' <i>g</i>
	M	Range	M	Range			
Emotional Condition	15	19 (max 26 min 7)	8	15 (max 18 min 3)	305	<0.001*	1.676
Cognitive Condition	19	24 (max 29 min 5)	8	15 (max 17 min 2)	152	<0.001*	2.303

Note: M = Mean; Hedges' *g* effect size >0.2 = small; >0.5 = Medium; >0.8 = Large (Ledezman et al., 2008).

**Table 2.** Mean and range by group in each of the conditions of the Young's moral judgment questionnaire. The conditions take their name according to the action (neutral-negative) and after the consequence of that action (neutral-negative).

Variables	Adolescents		Young Adults		<i>U</i>	<i>p</i>	Hedges' <i>g</i>
	M	Range	M	Range			
Neutral-Neutral	5	6 (max 7, min 1)	6	6 (max 7, min 1)	-0.030	0.800	0.030
Neutral-Negative	2	3 (max 4, min 1)	6	5 (max 7, min 2)	-2.607	<0.001*	2.607
Negative-Neutral	6	5 (max 7, min 2)	1	3 (max 4, min 1)	3.150	<0.001*	3.153
Negative-Negative	1	4 (max 5, min 1)	1	2 (max 3, min 1)	0.873	0.113	0.420

Note: M = Mean; Hedges' *g* effect size >0.2 = small; >0.5 = Medium; >0.8 = Large (Ledezman et al., 2008).

young adults. The size of the effect in those variables with significant differences (neutral-negative and negative-neutral) is large, which implies a strength in said significant differences of both groups.

#### 4. Discussion

The purpose of this research was to compare performance in decision-making and moral judgment tasks between adolescents and young adults. Based on the results obtained in the Columbia Card Task Test, it is confirmed that adolescents, both in the emotional task and in the cognitive task, tend to make decisions with greater risk compared to young adults. It is also important to note that the effect size of the difference was larger in the cognitive version than in the emotional version. For young adults, they show a smaller number of selected cards in both tasks compared to adolescents. These results agree with what some authors have reported in relation to the emotional and cognitive development of the human being throughout life, indicating that emotional processes prevail in adolescence when decisions are made, even when decisions must be made with greater cognitive component, adolescents continue to take risks even more than in emotional conditions, this suggests that sometimes what is sought is the immediate benefit of things. On the other hand, cognitive processes carry out a gradual and increasing process from childhood to adulthood, where both processes (emotional and cognitive) do not carry a parallel development throughout life (Hammerstein & Stevens, 2012).

Despite the fact that there is little evidence regarding studies that use the Columbia Card Task at similar ages, the results of this study agree with those found



by [Figner et al. \(2009\)](#), where adolescents tend to make riskier decisions both in the emotional component as well as in the cognitive component, a situation that was found in this investigation; which could explain and verify for these authors, what they have called a double system in DM, as a result of the competition between the emotional processes that tend to cancel the system of cognitive processes in a state of emotional arousal. No studies were found that used the same test (Columbia CardTask) in young adults that could give an antecedent of previous results and the comparison of our study with them, therefore, this research contributes to the work on DM in young adults from 18 to 24 years of age.

Regarding Young's Moral Judgment Questionnaire, it is suggested that adolescents in the neutral-negative condition consider that the results or consequences that are presented are inappropriate, despite the fact that in the action there has no intention to cause harm (neutral), unlike young people who think it is more appropriate, because there is no evil intent in the action itself, regardless of the result or consequence of the action (negative). Regarding the negative-neutral condition, adolescents consider the action more appropriate, despite the fact that there is a clear intention to cause harm (negative), without the results being negative (neutral), different from young people who believe that the action is inappropriate because there is a clear intention to cause harm (negative), despite the fact that the results or consequences have been positive (neutral). The study carried out by [Baez et al. \(2014\)](#) reports that control participants value the neural-negative condition as moderately appropriate, while the negative-neutral condition is inappropriate. The same situation was found with the young adults in our study. These results lead to the understanding that, what has been chosen after reflecting, both on the environment and on the likely consequences of carrying out an action considering the acts themselves whether good or bad, adolescents focus on the consequences, without giving priority to the act as such, for their part, young people emphasize the error (or the evil intent) in the act itself, it is clear that this is where the intention of causing harm to others can be found, despite the fact that the consequence has been positive.

No studies were found where Young's Moral Judgment Questionnaire was used for ages similar to this study, however, [Majluf's \(1986\)](#) research agrees with the results of our study, which evaluated 80 adolescent and young participants from a Peruvian population, belonging to the middle class, in order to observe the evolution of MJ development, through the use of the multiple choice questionnaire of moral reasoning proposed by [Gibbs et al. \(1984\)](#). His results indicate an increase in the sequence of stages and their increase with age in terms of decisions with a moral component, that is, the older the participants, the greater the increase and awareness of moral judgment; The same situation was found in our study.

## 5. Conclusion

Currently, researchers and clinicians are looking for instruments that allow them

to discover which components are involved in the decisions we make and which of them predominates in certain choices, in order to offer mechanisms that allow new knowledge in the study of healthy people and that can be later applied when there is suspicion of any pathology in this regard. The use of the Columbia Card Task test makes it possible to clearly differentiate between the emotional component and the cognitive component when making a decision. The results with the test show that there are significant differences with an emotional and cognitive component between adolescents and young adults.

On the other hand, when assessing the moral state of an action with Young's Moral Judgment task, not only the results are considered, but also the intentions or beliefs that are held before said action, therefore, future studies must take into account that, on many occasions, the consequence of the action does not matter, but rather the intention or belief behind it. That is, it must be taken into account if the subject expresses himself explicitly with the intention of causing harm during the development of the action. The cognitive and emotional capacity to make decisions about thinking about the beliefs, intentions, consequences and behavior of other people, is what has been assessed in this study.

This research points at two important aspects about how both groups make decisions, on the one hand, adolescents give priority to the consequence of the action, that is, they omit the behavior of the agents, believing that if the consequence is negative (harmful), it is considered an inappropriate action for the simple fact of having resulted in harm to a person. On the other hand, young adults take the action into account more than the consequence, realizing that there is a clear intention to cause harm by the agent; they indicate that the action is inappropriate, regardless of the consequence thereof. In real life, social aspects, unlike experimental scenarios, direct access to the evaluation of others, are characterized by how one acts in certain scenarios, not only showing the results (consequences) of an action, but as proceeded to reach this result.

The MJ often represents a complex decision for the subjects, in this case for adolescents and young adults characterized by multiple factors, such as the consequence of the action, the development and the behavior of the agent. The most rational MJ is dominated by the behavior itself, while the most emotional focuses on the consequence of the acts carried out. Therefore, this study should inform current theories about how adolescents and young adults process and make decisions differently from the actions of others, as well as the specific context of moral judgment.

There are limitations in this study that must be taken into account for future research, one of them is that the population used for the experiments corresponds only to the population of Cuernavaca and its surroundings, so it is necessary to expand the sample to other federal entities. To give greater validity and reliability to the results, likewise, the population that was used both in the group of adolescents and young adults, are of high education, so that for future studies participants with low education could be included, regardless the age or group to

which each of the participating subjects belong, likewise, the socioeconomic level ranges from medium to medium low, so it would also be convenient to include participants of other economic levels.

## Conflicts of Interest

The authors declare no conflict of interest during the process and publication of the results of this research.

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