

The Impact of Age on the Perception of Cognitive Abilities and Decision-Making Skills

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Abstract

Nowadays organizations are operating in a dynamic and turbulent environment. In these conditions, the situations are very complex and the problems are unstructured. So, to make good decisions the organizations are moving toward group decision-making. The advantages of such processes are numerous when compared to individual decision-making. The main goal of the current research focuses on the perception of cognitive and decision-making abilities, trying to understand if there is a relationship between them and age and how such perceptions may influence the attitudes toward group decision-making process. This study focuses on the banking institutions in Albania, as the most developed segment of the financial system and the entire Albanian economy and as a sector where group decision-making processes are widely used. It is generally thought that adults are less productive, less motivated, more adverse to innovation and less skilled in learning. With the age, the individual undergoes substantial changes regarding the information processing speed, memory, reasoning, concentration and executive functions. It has been shown that these changes move in the opposite direction with respect to age. Then what to do, avoid that adults make decisions? The relationship between age, cognitive and decision-making abilities is very complex. Cognitive limits orient adults to the adoption of compensatory decision-making strategies. In these circumstances, the question that arises is whether the group decision-making process can be an effective tool to balance these skills. On the basis of the responses offered by 247 participants and adopting the quantitative methodology, the current research tries to answer this question.

Keywords: age, cognitive abilities, decision-making skills, group decision-making

Introduction

The effect of age on the decision-making process is not unilateral¹, but it can also affect the quality of the decisions taken. The question that arises is whether really there are differences in the capabilities and quality of decisions related to age. According to different empirical evidences adults adopt different strategies for information elaboration, but the decision-making skills do not decrease. Other studies have concluded that adults tend to avoid the decision-making and search less information, but there isn't a decline in the decision-making skills as we age, although may occur the use of different cognitive processes.

It is considered important the understanding of age impact on the quality of both problem-solving and decision-making. Some studies on problem-solving are focused in highlighting how the individual perceives the problem, which depends mainly on how the individual perceives the causes and consequences. The required capabilities in order to define the problem and identify possible alternatives have also been studied. On the other hand, studies related to decision-making refer to the evaluation methods of the alternatives and the choice strategies. For both these macrophases the results are contradictory.

In the attempt to offer an explanation to the age-related differences regarding the decision-making process we must take into consideration the changes over time on the cognitive processes. Most of the empirical evidences suggest that cognitive capacities worsen with age. However, this can not be said with certainty since some evidences reported the contrary. Apparently, the relationship between age and cognitive abilities is very complex. Cognitive limits orient adults to adopt

¹ The age does not affect only the attitudes toward risk.

compensatory decision-making strategies. In these circumstances, another question that arises is whether the group decision-making process can be an effective tool to balance these skills.

Aim of the study and research questions

When talking about the decline of cognitive and decision-making abilities the age may be an important variable. But is there really a relationship between age and quality of decisions?

The main goal of the current research focuses on the perception of cognitive and decision-making abilities, trying to understand if there is a relationship between them and age and how such perceptions may influence the attitudes toward group decision-making process. This study focuses on the banking institutions in Albania, as the most developed segment of the financial system and the entire Albanian economy. A further motivation for concentrating in this sector is that within the banking institution group decision-making processes are widely used (Osmani, 2016).

To support the main purpose, the research questions are as follows:

1. Are there important differences in the perceptions of cognitive abilities between adults and young people?
2. Does the age affect the perceptions of the decision-making skills?
3. Is the preference for group decision-making process influenced by the age or by the cognitive and decision-making perceptions?

In consistency with the main goal and the research questions the hypotheses to be tested are formulated as below:

H₁: Adults believe more than young people that the deterioration of the cognitive abilities leads to bad decision-making skills;

H₂: Adults believe more than young people that as we age the cognitive abilities deteriorate;

H₃: Adults don't think that their information processing speed and memory are worse compared to young people;

H₄: As we age the decision-making skills improve;

H₅: Adults believe more than young people that group decision-making processes can compensate limited cognitive and decision-making skills;

H₆: Adults prefer group processes for making a decision more than young people.

Methodology

For the current research was adopted the quantitative methodology and the data collection was made through the questionnaire using the Likert scale 1-5. This tool was useful in gathering opinions, motivations and perceptions regarding the cognitive abilities and decision-making skills and thus understanding whether such variables affect group decision-making propensity.

The data processing is done through SPSS. To test the hypotheses of the research is used the correlation coefficient that is useful to find out if between two variables exist a relationship. So, first is calculated Pearson correlation coefficient for understanding if between the variables there is a linear relationship and then is calculated the correlation coefficient of Spearman to assess if the relationship is positive or negative. The confidence interval used is 95%, reporting however important relationships between the variables for confidence intervals 90% and 99%.

For the current research is chosen the non-probability sampling technique, mainly in the form of purposive sampling. So, the units of analysis are chosen for belonging to different age intervals, allowing a good exploration of the research questions. In some cases, in addition to the purposive sampling, it was also used the snowball technique.

A total of 350 questionnaires were distributed and 247 collected, with a response rate of 70.6%. The research is focused on the banking institutions and their branches in Tirana and Durres, as the two main cities of Albania. Following, Table 1 reports the distribution of participants for different age intervals.

Table 1: Participants distribution for age intervals

Age interval	Nr.	%
20-29	112	45.3%
30-39	87	35.2%
40-49	32	13%
50-60	16	6.5%
Total	247	100%

Age, cognitive abilities and decision-making skills: Theoretical approach

In the attempt to offer an explanation for age-related differences regarding the decision-making process we can refer to two approaches: the psycho-physiological approach and the cognitive approach (Sproten, Diener, Fiebach and Schwieren, 2010).

According to the psycho-physiological approach, over time the individual undergoes changes at the physiological, morphological, molecular and functional level. The changes that occur to the brain level are different. There are some regions of the brain involved in the decision-making and with the age in different individuals change different regions. In this regard, it might be of interest the dorsolateral prefrontal theory. MacPherson, Phillips and Della Sala (2002) argue that the decrease of the decision-making performance in adults is a result of the dysfunction of the dorsolateral part of the frontal lobe which increases over time. The changes that this part of the brain undergoes influence especially the executive functions and memory.

Referring to the second approach, with the age the cognitive, emotional and information elaboration processes worsen in variable ways from individual to individual. With the increasing complexity of the decision, because of the decline of cognitive abilities, adults are not able to make a good decision (Finucane, Mertz, Slovic and Schmidt, 2005). On the other hand, Mata, Schooler and Rieskamp (2007) argue that adults search less information, need more time and use simpler decision-making strategies than younger people, but there are no differences in the quality of decisions. The cognitive changes during the life cycle are complex: many cognitive abilities change during life, while others do not. Some of the cognitive changes are detrimental for the decision-making process, others have no impact and others can improve decision-making (Healey and Hasher, 2009, p.17).

One of the elements influenced by age is memory. In this regard it may be important to report the dynamics of information recovery from the memory and the influence it can have on the generation of alternatives and choice. Lechuga, Gómez-Ariza, Iglesias-Parro and Pelegrina (2012) found no differences between adults and young people about memory accessibility. It was also showed that although there are no differences, the adults are able to make better decisions. This could be explained by the fact that adults are more oriented to the use of decision-making strategies that require minor cognitive abilities. Some authors believe that there is a connection between memory and the ability to estimate the probabilities of the different alternatives, which could be a consequence of the fact that the decision-maker tends to automatically store the common information (Zacks and Hasher, 2002). Whereas adults during their lives have been in contact with more information than younger people, a decline in working memory might not be harmful to the decision-making process.

Some memory elements such as crystallized knowledge, the general level of information, the understanding of different semantics and the use of long-term memory, usually do not suffer a decline due to age and sometimes can also improve, but with the age may worsen the episodic memory (Healey and Hasher, 2009).

D'Zurilla, Maydeu-Olivares and Kant (1998) concluded that decision-makers of 40-55 years old have a more constructive and optimistic vision of the problems and their decision-making skills than other intervals of age. In addition, compared to young people, this age group showed a less negative and dysfunctional orientation about the problems, tends less to postpone and avoid this process, or to engage in a careless and impulsive attitude. The authors explain the result compared with the first group (17-20 years) as a consequence of a higher experience, while for the second group (60-80 years) they believe that the difference depends more on the diversity of the problems than on the decline of the capacities and basic skills.

It is also interesting the discussion on numerative capacities. Often, the decision-maker has to decide based on the interpretation of numerical information. He must have the ability to select, analyze and manipulate the information through calculations and comparisons. It seems that over time these abilities get worse (Mather, 2006). The decision-makers with less numerative capacities perceive the situations as more risky (Dieckmann, Slovic and Peters, 2009).

As time goes by, the working memory is reduced and for the adults become difficult keeping in mind different information and making comparisons (Mather, 2006). Consequently, the adults search less information to make a choice. Streufert, Pogash, Piasecki and Post (1990) found that tactical managers in the group of adults requested less additional information than the group of young tactical managers. However, the conclusions can not be generalized. So, Johnson (1997) didn't found differences even when to the adults was given an external memory support and so they have not to memorize all the information. Mather, Knight and McCaffrey (2005) believe that adults search less information in the context in which most of the information available is negative. They have concluded that for making a choice the adults rely more on the positive outcomes than in negative ones compared to young people.

In the attempt to explain the differences in the decision-making process between young people and adults, we must consider that in the various stages of life individuals may have different reasons to use their cognitive abilities (Erber, 2013). Thus, in the acquisition phase that relates to childhood and adolescence, the individual will engage in accumulating knowledge and skills that will be used later. During the phase of achievement that relates to youth, the individual will engage on finding how to use the acquired knowledge in order to achieve long-term goals that relate in particular to the career. Instead, in the execution phase which refers to middle age, the individual tries to take leadership roles, while in the re-integration phase, the individual becomes more selective about cognitive commitment. At this stage he is less motivated in acquiring new information in quantity and does not want to waste time on activities that are not considered important. It is not clear if the selection process is a result of biological or neurological changes that limit the cognitive functioning, or is a reaction to the fact that the responsibilities diminish and increases the awareness that the future is less distant (Erber, 2013, p.202).

When talking about the impact of age on the decision-making skills and quality of decisions it might be interesting to consider the link between age and wisdom. Defining wisdom is not easy. For most individuals, wisdom refers to the intelligence and ability to understand complex issues and relationships and increases following a broad spectrum of positive and negative experiences (Glück and Bluck, 2011). In this regard, one might conclude that adult people are wiser, which means that they are able to understand better the complex situations and thus make more effective decisions.

It is considered important the understanding of age impact on the quality of both problem-solving and decision-making. In some empirical evidences it has been found that individuals of 40 years old were able to identify more alternatives than other age groups (Denney and Palmer, 1981; Denney and Pearce, 1989). Artistico, Cervone and Pezzuti (2003) found no differences between young and adult people, who showed a high level of performance for problems and situations they considered particularly important. Referring to decision-making, Thornton and Dumke (2005) concluded that with age the decision-making skills deteriorate and as a result the quality of the decisions decreases.

We can adopt two approaches to improve problem-solving (Marsiske and Margrett, 2006). The first approach refers to the formation and training processes, while the second considers important the cooperation and participation. According to Pezzuti, Artistico, Tramutolo, Cervone and Black (2009) the training processes can increase the capacity of adults regarding the problem-solving. The authors through empirical studies have proved that the training processes less elaborate and more pragmatic are the best. Also, when to the participants were offered during the training procedures, more information so as to overcome the problem space, it was noted that they were able to identify more possible solutions. Moreover, the adults in the experimental group showed higher levels of self-efficacy that converged with the improved performance after training. To explain this we can refer to the theory of self-perception of the abilities (Cervone, Artistico and Berry, 2006). When a particular decision is placed in a context that is relatively familiar to the decision-maker, is preferred personal knowledge that contributes to higher valuations of self-efficacy. In contrast, unfamiliar contexts may lead the decision-maker to think that does not have the necessary capacity to decide effectively. Thus, referring to this approach may increase the propensity for group decision-making processes, in order to preserve the quality of decisions.

With the age, the individual undergoes substantial changes regarding the processing speed, memory, reasoning, concentration and executive functions (Mienaltowski, 2011, p.75). It has been shown that these changes move in the

opposite direction with respect to age. But then the question that arises is what to do, avoid that adults make decisions? We must not forget that wisdom increases, and they have accumulated more experience, which helps them to make good decisions. However, we have to consider that as we age decreases the number of the identified alternatives, but increases the number of effective alternatives (Mienaltowski, 2011).

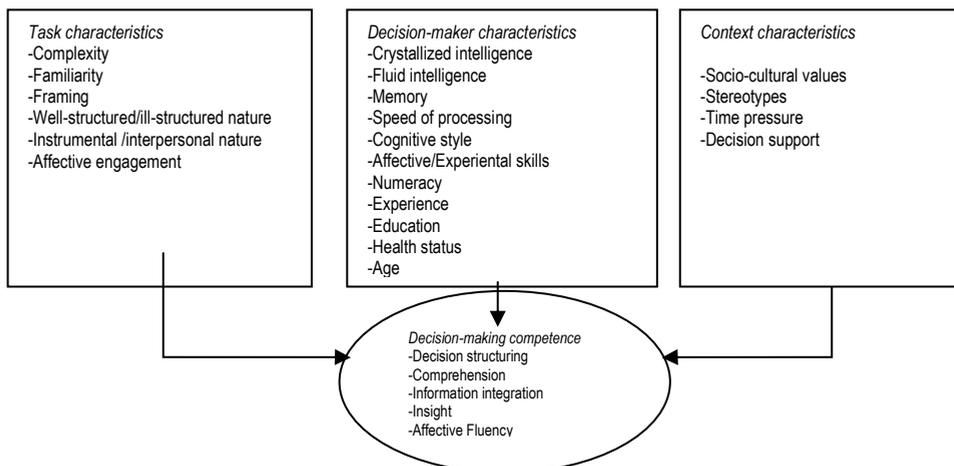
Is not easy the understanding of the relationship between age and problem-solving effectiveness, which depends on what we mean by effectiveness. If for effective problem-solving we mean to identify more possible solutions then young people do better, but if for effectiveness we refer to higher quality solutions then adults do better.

Cornelius and Caspi (1987) define the effectiveness of problem-solving based on the level in which the identified solutions converge with those given by a panel of experts. The authors asked participants between 20 and 78 years to consider 48 hypothetical problems defined incorrectly and belonging to different domains. In addition, it was asked to what extent they could use one of the four specific strategies in the attempt to solve the problem: the intentional action (taking individual action to remedy the problem), the cognitive analysis (designing the action and reflect on the situation for a better understanding), the dependent behavior (not doing anything to change the situation or rely on others), and avoid thinking and deny (distract attention from the problem, avoid responsibilities and deny the emotions). After that, the identified strategies by participants were compared to those of the experts. It was found a positive correlation between age and effective strategy. Contrary to young people, the adults had identified strategies that converged with those recommended by the experts.

Adults perform worse than young people in decisions that require a quick response and a variability of behaviors (Okun, 1976; Salthouse, 1985). For Reese and Rodeheaver (1985) this is typical for adults, and is called caution. In this respect, studies are contradictory. There are empirical evidences which show no relationship between age and caution (Baron and Le Breck, 1987; Baron and Surdy, 1990). According to Johnson (1990), young people are able to analyze more alternatives in the same interval of time than adults, making so more good decisions. It has been shown that the decisions of adults in the financial field are of lesser quality than the financial decisions of young people (Henninger, Madden and Huettel, 2010). On the other hand, Mather, Gorlick and Lighthall (2009) believe that adults perform better than young people and need less time to make a decision, but the opposite happens when they have to perform and decide under stress conditions. Of particular interest are the conclusions of Roalf, Mitchell, Harbaugh and Janowsky (2011). They concluded that as the decision-maker ages, he becomes less impulsive, more risk-averse and is looking for more sensations than younger people.

The decision-making skills are influenced by a multiplicity of factors as also shown in Figure 1. These variables refer to the degree of problem structuring, the understanding of relevant information, the integration of different information, to the understanding of the own capacities limits (Finucane and Lees, 2005). So, to evaluate the decision-making skills is necessary to consider the characteristics of the decision-maker, of the problem and of the context (Finucane, Mertz, Slovic and Schmidt, 2005; Finucane and Gullion, 2010).

Figure 1: Variables that influence decision-making skills



(Source: Finucane and Lees, 2005, p. 9)

The problem structuring can be considered crucial because by this time depends the effectiveness of the whole decision-making process. It's a step in the process which refers to the definition of the problem, the understanding of its causes, the possible solutions and the respective outcomes and also the assessment of probabilities for each alternative. The structuring of the problem depends on the individual characteristics of the decision-maker. Also the information understanding is important and requires a deep analysis of the documents, tables and charts. Afterwards are required the capabilities of information manipulation and integration. This step is important, because if the same information is integrated in different ways it can lead to different decisions. But why the problem structuring depends on the characteristics of the decision-maker? All the above activities are influenced by fluid intelligence, memory, and processing speed that undergo changes over time. The decline of memory and processing speed and a greater use of simple strategies make adults more inconsistent than young people regarding the decision-making process, through the different views of the information statistically equivalent (Finucane and Gullion, 2010, p.273).

From the above discussion, most of the empirical evidences conclude that cognitive and decision-making capacities worsen with age. However, this can not be said with certainty since some evidences reported the contrary. Apparently, the relationship age-cognitive abilities is very complex. Cognitive limits orient adults to adopt compensatory decision-making strategies. In these circumstances, the question that arises is whether the group decision-making process can be an effective tool to balance these skills.

Empirical evidences about the preference of adults for group decision-making processes are contradictory. There are cases where adults are not aware of the lower decision-making skills and prefer individual decision-making processes (Berg, Strough, Cauldron, Samson and Weir, 1998), as there are others where the age does not affect at all the preference for group decision-making (Berg, Johnson, Meegan and Strough, 2003). Previously, the studies of Denney and Palmer (1981) have confirmed that adults prefer group processes more than young people.

Results and discussion

The current research focuses on the perception of cognitive and decision-making abilities within the banking institutions taken into analysis, trying to understand if there is a relationship between them and age and how such perceptions may influence the attitudes toward group decision-making process. Following are reported the results obtained and the discussion on some aspects considered important.

The first hypothesis to be tested is:

H1: Adults believe more than young people that the deterioration of the cognitive abilities leads to bad decision-making skills

Table 2: The impact of cognitive abilities on decision-making skills

			Age	1. The deterioration of cognitive abilities leads to bad decision-making skills
Spearman's rho	Age	Correlation Coefficient	1.000	.029
		Sig. (2-tailed)	.	.645
		N	247	247
1.The deterioration of cognitive abilities leads to bad decision-making skills		Correlation Coefficient	.029	1.000
		Sig. (2-tailed)	.645	.
		N	247	247

As noted in the Table 2 there isn't a relationship statistically significant between age and the tendency to consider the deterioration of cognitive abilities as a cause for decision-making skills less good (Sig.= $p=0.645>0.01$). Spearman correlation coefficient is positive ($r_s=0.029$). So, the adults have such perception more than young people, but this can't be generalized for the entire population.

So, there are no differences between adults and young people in the perception of the fact that the deterioration of cognitive abilities leads to decision-making skills less good. It should be remembered that in the various stages of life, the individuals may have different reasons to use their cognitive abilities. Although, the cognitive abilities may worsen over time, the right choice of the decision-making strategy can make possible that such deficits do not affect decision-making skills.

The second hypothesis to be tested is:

H₂: Adults believe more than young people that as we age the cognitive abilities deteriorate

Table 3: The impact of age on cognitive abilities

			Age	2. As we age the cognitive skills deteriorate
Spearman's rho	Age	Correlation Coefficient	1.000	-.070
		Sig. (2-tailed)	.	.274
		N	247	247
2. As we age the cognitive skills deteriorate		Correlation Coefficient	-.070	1.000
		Sig. (2-tailed)	.274	.
		N	247	247

Referring to Table 3 above, we can conclude that there is not a relationship statistically important between age and its perception as a variable that influences negatively the cognitive abilities (Sig.= $p=0.274>0.05$). Spearman correlation coefficient indicates a negative relationship ($r_s=-0.070$), but is not statistically significant for the entire population.

It is usual thinking that over time some of the cognitive processes worsen. However, also in this case the empirical evidences do not offer definitive conclusions. Thus, it has been found that with the increase of the decision complexity, because of the decline of cognitive abilities the adults are not able to make good decisions (Finucane, Mertz, Slovic and Schmidt, 2005). The results obtained from the current research show that there are no differences statistically significant between adults and young people in their perceptions regarding the influence of age on the cognitive abilities.

Another hypothesis to be tested is formulated as follows:

H₃: Adults don't think that their information processing speed and memory are worse compared to young people

As in Table 4 below, between age and the perception of information processing speed and memory, there is a relationship statistically significant, even for $\alpha = 0.01$ (Sig.= $p=0<0.01<0.05$). Spearman correlation coefficient indicates a negative dependency ($r_s=-0.247$). So, adults do not believe that their memory and information processing speed are worse compared to those of young people.

Table 4: Age impact on processing speed and memory

			Age	3. The information processing speed and memory of young people are better
Spearman's rho	Age	Correlation Coefficient	1.000	-.247(**)
		Sig. (2-tailed)	.	.000
		N	247	247

3. The information processing speed and memory of young people are better	Correlation Coefficient	-0.247(**)	1.000
	Sig. (2-tailed)	.000	.
	N	247	247

** Correlation is significant at the 0.01 level (2-tailed)

The fourth hypothesis is formulated as follows:

H4: As we age the decision-making skills improve

Table 5: The impact of age on decision-making skills

		Age	4. Over time, decision-making capabilities improve
Spearman's rho	Age	1.000	.092
	Correlation Coefficient	.	.150
	Sig. (2-tailed)	247	247
4. Over time, decision-making capabilities improve	Correlation Coefficient	.092	1.000
	Sig. (2-tailed)	.150	.
	N	247	247

Referring to Table 5 above, we can conclude that there is not a relationship statistically important between age and its perception as a variable that influences positively the decision-making skills (Sig.=p=0.15>0.05). Spearman correlation coefficient indicate a positive relationship ($r_s=0.092$), but is not statistically significant for the entire population.

D'Zurilla, Maydeu-Olivares and Kant (1998) concluded that adults have a more constructive and optimistic view of the problems and their decision-making skills than younger people, as a consequence of more experience. Contrary to this, we didn't found a relationship between age and the fact that the decision-making skills improve over time. This maybe because the adults tend more to think that the decisions to be taken are new, so they do not overestimate their experiences. The conclusion of the current research is consistent with that of Artistic, Cervone and Pezzuti (2003). They didn't found differences between young people and adults, who showed a high level in performance when it came to problems and situations that they considered particularly important. Therefore, the use of decision-making skills does not depend on age, but on the degree of the importance of the decisions.

The fifth hypothesis is:

H5: Adults believe more than young people that group decision-making processes can compensate limited cognitive and decision-making skills

Table 6: The perception of group decision-making process

		Age	5. I believe that group decision-making processes are the best way to compensate limited cognitive and decision-making skills
Spearman's rho	Age	1.000	.102
	Correlation Coefficient	.	.110
	Sig. (2-tailed)		

5. I believe that group decision-making processes are the best way to compensate limited cognitive and decision-making skills	N	247	247
	Correlation Coefficient	.102	1.000
	Sig. (2-tailed)	.100	.
	N		247

Referring to Table 6 above we can conclude that there is a relationship statistically significant between age and the perception of the group as a useful tool for balancing possible cognitive and decision-making deficits (Sig.=p=0.1). Spearman correlation coefficient is positive ($r_s=0.102$). So, adults believe more than young people that group decision-making processes are the best way to compensate personal cognitive and decision-making limits.

The sixth hypothesis is:

H₆: Adults prefer group processes for making a decision more than young people

As can be noticed in the Table 7 below, the results indicate a relationship statistically important between age and the propensity for group decision-making (Sig.=p=0.002<0.01). Referring to Spearman correlation coefficient, this relationship is positive. The adults prefer group decision-making processes more than young people ($r_s=0.199$).

Table 7: Age and group decision-making propensity

			Age	6. Generally, I prefer to make a decision the group decision-making processes
Spearman's rho	Age	Correlation Coefficient	1.000	.199(**)
		Sig. (2-tailed)	.	.002
		N	247	247
6. Generally, I prefer group processes for making a decision		Correlation Coefficient	.199(**)	1.000
		Sig. (2-tailed)	.002	.
		N	247	247

** Correlation is significant at the 0.01 level (2-tailed)

The experience helps the development of knowledge and automated processes that facilitate the decision-making (Finucane and Gullion, 2010). So, why adults do not prefer deciding alone, but are more propense to group decision-making processes? Perhaps because they believe organizations have to face more with new decisions and situations, never met in the past and so, the risk is higher.

Conclusions

The current research was focused on the impact of age in the perception of cognitive and decision-making skills and in understanding whether these perceptions influence the propensity for group decision-making. The self-confidence is an important variable for the decision- making performance.

So, there are no differences between adults and young people regarding the relationship between cognitive abilities and decision-making skills. They do not believe that the deterioration of cognitive abilities leads to bad decision-making skills. Also, there were not found differences referring to the negative impact of age on the cognitive abilities and and its perception as a variable that influences positively the decision-making skills. However, there is an important correlation between age and the perception of information processing speed and memory. The adults do not believe that their memory and information processing speed are worse compared to those of young people.

Furthermore, on the basis of the results obtained we can conclude that there is a significant relationship between age and the perception of the group as a useful tool for balancing possible cognitive and decision-making deficits. So, adults believe more than young people that group decision-making processes are the best way to compensate personal cognitive and decision-making limits.

Interesting is the fact that with the age increases the collaborative spirit and the adults feels better as member of a group. The current research found that age affects positively the group decision-making propensity. So, regardless the perceptions of cognitive and decision-making capacities, the adults have a higher propensity for group decision-making processes compared to young people.

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