Factors that affect decision making: gender and age differences

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Abstract

In this study, the influence of gender and age in the importance allocated to several factors in the decision process was investigated from a naturalistic perspective. For this purpose, the Decision-Making Questionnaire, DMQ was administered to a sample of 589 participants (294 men and 295 women) of ages between 18-80 years old, who were grouped into three developmental stages: youths 18-25 years (n= 207; 97 men and 110 women); adults 26-65 years (n= 205; 110 men and 95 women), and retired persons 66-80 years (n= 177; 87 men and 90 women). The statistical analyses revealed significant differences due both to gender and age in participants' perception of the factors that determine their decision processes.
Keywords: Decision-making, Decision task, Gender, Age.

Resumen

En este estudio se investigó, desde el enfoque naturalista, la influencia que tienen el sexo y la edad en la importancia que se otorga a ciertos factores en el proceso de decisión. A tal fin, se aplicó el Cuestionario de Toma de Decisiones (CTD) a una muestra formada por 589 participantes (294 hombres, 295 mujeres) de edades comprendidas entre 18 y 80 años, agrupados en tres etapas evolutivas: jóvenes, de 18 a 25 años (n= 207: hombres 97, mujeres 110); adultos, de 26 a 65 años (n= 205: hombres 110, mujeres 95) y jubilados, de 66 a 80 años (n= 177: hombres 87, mujeres 90). Los análisis estadísticos revelaron que existen diferencias significativas debidas al sexo y a la edad en la percepción que los sujetos tienen de los factores que determinan sus decisiones.
Palabras clave: toma de decisiones, tarea de decisión, sexo y edad.

The process of decision making is one of the most complex mechanisms of human thinking, as various factors and courses of action intervene in it, with different results. Orasanu and Connolly (1993) define it as a series of cognitive operations performed consciously, which include the elements from the environment in a specific time and place. Narayan and Corcoran-Perry (1997) consider decision making as the interaction between a problem that needs to be solved and a person who wishes to solve it within a specific environment.

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There are several steps that must be followed in order to arrive at a decision: one must realize that it is going to be necessary to make a decision, determine the goals to be achieved, generate alternatives that lead to attaining the proposed goals, evaluate whether these alternatives meet one's expectations and, lastly, select the best alternative, the one that implies an efficient global result (Halpern, 1997). This entire process is affected by personal and environmental variables. In effect, individuals may make different decisions depending on whether they feel their boss is observing them, on the amount of information they have, or if certain motivations play a relevant role in their lives.

Basically, the theories that study decisions can be grouped into two perspectives: normative and descriptive. The normative perspective explains the choice of individuals who are behaving rationally in a task that requires decision making and -using statistical models- predicts the subjects' responses from the information provided about each alternative. The descriptive perspective explains how individuals actually choose, that is, the psychological processes and the task and environmental characteristics that underlie judgments and choices. One of the basic differences between these viewpoints is the way they consider the decision maker. The normative viewpoint confers an "unlimited" processing capacity on decision makers that allows them to examine exhaustively all the possible alternatives and choose the best. The descriptive perspective grants a "limited" processing capacity that often leads decision makers to make mistakes when considering complex and dynamic tasks, although they tend to choose options that satisfy them.

At present, one of the most important descriptive theories is the naturalistic theory, which investigates decisions that concern people in the real world and the factors that affect them, instead of the daily or irrelevant decisions that are studied by the normative theories in laboratory tasks. This interpretation of the decision process, which is typical of the naturalistic theory, underlines the role of experience and personal competence in this process. The naturalists attribute eight factors to any important decision in one's personal, academic, professional, or social life: the decision involves relevant and ill-structured problems; it occurs in uncertain and dynamic environments; it proposes shifting, ill-defined, or competing goals; it generates multiple event-feedback loops; it is performed with time constraints; it involves high stakes; it allows the participation of multiple players; and, lastly, there are organizational norms and goals that must be balanced against the decision makers´ personal choice (Orasanu & Connolly, 1993). Some, if not all, of these factors must be present in the decision process for it to be considered naturalistic. Moreover, it must have significant consequences for the decision maker. In general, the naturalistic approach to decisions tries to show that people can make the right decision without having to perform sophisticated calculations. They only need to use their experience to recognize the decision problem as similar to other previous ones and to evaluate all the variables that affect each one of its phases.

According to Cannon-Bowers, Salas, and Pruitt (1996) the aforementioned characteristics, along with others, comprise the essential traits of a decision, which these authors classify into three groups of variables: (a) task factors associated with the nature of the decision, such as the uncertainty involved in each alternative, time and

money pressure, quantity and quality of the information, expected goals, and possible consequences of the decisions; (b) internal decision maker factors, such as motivation, emotions, exhaustive information processing, experience, and regulation of the decision-process stages; (c) factors of the environment in which the decision is made, although they are not a direct part of the decision itself, such as social influence, coercion of close persons, and work demands.

As with other psychological phenomena, sex and age are among the variables that affect decision making, or rather, that allow one to establish individual differences. The fact is that our decisions are affected by our beliefs about the characteristics that differentiate the sexes, although these beliefs may be based on questionable criteria. Despite the fact that society is progressing towards social and labor equality between men and women, it is necessary to continue to examine -from a psychological perspective- whether there are sex differences in the importance that people allocate to factors that determine the decision process. Till now, the results of research are somewhat ambiguous because, although some significant differences have been identified, most of them are minimal (Crow, Fok, Hartman, & Payne, 1991; Hatala & Case, 2000; Hawkins & Power, 1999; Venkatesh, Morris, & Ackerman, 2000). It seems that women are more affected by the environment; they look for more information, and dedicate more time to the decision process (Gill, Stockard, Johnson, & Williams, 1987). Men, on the contrary, are more dominant, assertive, objective, and realistic (Wood, 1990).

However, these differences have been interpreted as the result of the incidence of sex-related social norms and stereotypes that are transmitted in the form of values, traditions, and behavioral expectations. Together with some other educational factors, these probably foment and maintain some of the differences associated with certain aspects of decisions (Bussey & Bandura, 1999). Therefore, although till now the findings have been somewhat limited, it is relevant to continue to investigate these differences and determine how they are formed.

Regarding age, many studies within the naturalistic approach have been carried out with adults and, to a lesser extent, with youths and retired persons. Therefore, it would be interesting to analyze these three age groups conjointly. As with sex, researchers debate, without much conviction, about whether there are differences in the quality of the processes used by youths, adults, and retired persons. Some authors believe there are differences (Gardner, Scherer, & Tester, 1989; Dror, Katona, & Mungur, 1998) and others disagree (Chen & Sun, 2003; Moshman, 1993). Despite this, the variable age should be taken into account, especially when attempting to investigate from a naturalistic perspective, because this focus is specifically based on subjects' experience and competence, which are normally acquired with age. Craik and Salthouse (1992), for example, maintain this same interpretation in a study on information processing in older people, and Spaniol and Bayen (2005) observe that judgments are more tranquil in retired people, probably because of their difficulties with the working memory.

Taking into account the aforementioned proposals, the goal of the present study was to examine whether there are sex and age differences in the importance that people allocate to factors that, according to the naturalistic bibliography, affect decision making. This valuation was done without associating the factors and subfactors that determine

a decision in a specific situation, for example, a health problem, an economic problem or a feeding problem.

Method

Participants

The sample comprised 589 Spaniards of both sexes (*n*= 294 men and *n*= 295 women) from three developmental stages: 207 youths (97 men and 110 women) who were first-year university students from Law, Business Science, Nursing, and Social Work, ages 18 to 25 (*M*= 19.5 years, *SD*= 0.87); 205 adults (110 men and 95 women), who were professional lawyers, doctors, businessmen, journalists, firemen, and police force, ages 26 to 65 (*M*= 47.6 years, *SD*= 10.6); and 177 retired people (87 men and 90 women) who were professional lawyers, doctors, businessmen, mechanics, electricians, nurses, house wives, clerks, and administrative personnel, ages 66 to 80 (*M*= 69.3 years, *SD*= 5.6).

The university students were selected randomly from the Faculty of Human and Social Sciences and the University School of Health Studies. The professionals and the retired people were selected depending on the investigators' access to the work centers and Centers for the Third Age at that time. Although the groups' broad age interval could cause some difficulty in the interpretation of the data, we believe that this is compensated by the number of subjects in each subgroup. Another reason for dividing up the groups by these age limitations was due to the fact that the first contacts to capture the sample were relatively difficult; for instance, we found 37- and 60-year-old active professionals who offered to collaborate, and the same thing occurred with the retired people.

Instruments

The main purpose of the Decision Making Questionnaire, DMQ (*Cuestionario de Toma de Decisiones*), elaborated by Sanz de Acedo Lizarraga, Soria Oliver, and Sanz de Acedo Baquedano (2005) with a Spanish population, is to evaluate the importance that individuals allocate to the following aspects when they make decisions: uncertainty (six items), time/money constraints (eight items), information and goals (eight items), consequences of the decision (six items), motivation (five items), self-regulation (eight items), emotions (five items), cognition (six items), social pressure (seven items), and work pressure (five items). The factor analysis with Varimax rotation and maximum likelihood extraction revealed the structure of 10 first-order factors that are integrated into 3 broader second-order factors: task (uncertainty, time/money pressure, information and goals, and consequences of decision), decision maker (motivation, self-regulation, cognition, and emotion), and environment (social pressure and work pressure). Each item is rated on a 9-point scale, with values ranging from 1 (*not at all important*) to 9 (*extremely important*).

The DMQ is based on the naturalistic perspective of decision making, because

it attempts to appraise the factors that determine the important decisions taken in the real world, either in a personal or a professional environment. It is also based on the works of Cannon-Bowers *et al.* (1996), who proposed the above-mentioned list of variables that make up the essence of a decision.

The questionnaire was psychometrically tested in two previous studies; after introducing some changes, it achieved a high general internal consistency (α= .96) and a coherent factor structure of the 3 above-mentioned factors and 10 subfactors. In this study, Cronbach's alpha reliability index for the global instrument was .97 and the first- and second-order factor analyses confirmed the results obtained in previous statistical analyses. An item for each of the 10 scales of the questionnaire is offered in the Annex.

Procedure

After obtaining the consent of the respective institutional authorities and of the participants, the DMQ was administered in a group to the students during their regular university class schedule. It was administered individually to the adults at their work place, and in small groups (3 to 5 participants) to the retired persons in Centers for the Third Age. Total administration duration of the test was approximately 15 to 20 minutes. All the participants had a positive attitude towards the test, expressing their interest in the aspects dealt with in the questionnaire. The procedure guaranteed the participants' anonymity. Two researchers who had participated in the elaboration and validation of the instrument administered the questionnaire during the months of October, November, and December, 2003.

RESULTS

Student's *t* test for independent samples revealed statistically significant differences between men and women (see Table 1) in sex variable. The women allocated more importance than did the men to uncertainty [$t(587)= 4.65$, $p< .001$], time/money constraints [$t(587)= 5.07$, $p< .001$], the consequences of the decision [$t(587)= 5.89$, $p< .001$], the task factor [$t(587)= 6.35$, $p< .001$], emotions [$t(587)= 3.68$, $p< .001$], and social pressure [$t(587)= 5.39$, $p< .001$]. Conversely, men scored higher than women in information and goals [$t(587)= -6.42$, $p< .001$], motivation [$t(587)= -4.37$, $p<.001$], and work pressure [$t(587)= -7.52$, $p<.001$]. No differences were found in cognition, self-regulation, and the environmental factor.

The analysis of variance of the age variable detected relevant differences in the three groups (see Table 2). The youths only achieved statistically higher scores than the other two groups in the variables emotion [F (2,586)= 5.34, $p< .001$] and social pressure [F (2,586)= 7.79, $p< .001$]. The adults revealed significant differences compared with the other groups in time/money constraints [F (2,586)= 7.53, $p< .001$], information and goals [F (2,586)= 8.12, $p< .001$], and work pressure [F (2,586)= 9.26, $p< .001$], and the retired people only scored higher in uncertainty [F (2,586)= 10.15, $p< .001$]. Post hoc tests revealed statistically significant differences in the three age groups in uncertainty, time/money constraints, information and goals, emotion, and social pressure. There

Table 1. Means and Standard Deviations by Sex in the DMQ.

	Women (n = 295)		Men (n = 294)		
Variables	*M*	*SD*	*M*	*SD*	*t*
Uncertainty	38.40	7.44	32.65	6.97	4.65***
Time/money constraints	49.97	10.11	44.36	11.34	5.07***
Information/goals	39.55	11.35	45.63	10.14	-6.42***
Consequences decision	34.89	6.46	28.42	8.34	5.89***
Task factor	151.06	17.54	137.64	18.32	6.35***
Motivation	30.18	6.75	35.94	7.31	-4.37***
Emotions	34.46	5.89	26.19	5.68	3.68***
Cognition	42.27	8.36	41.57	7.48	ns
Self-regulation	46.38	7.89	45.79	8.45	ns
Subject factor	150.21	16.36	148.75	15.64	ns
Social pressure	41.52	8.66	35.34	7.69	5.39***
Work pressure	29.34	6.75	37.52	7.29	-7.52***
Environmental factor	60.49	12.37	61.94	11.65	ns

***p< .001

Table 2. Means, Standard Deviations and Post Hoc Test Results by Age Groups in the DMQ.

	Youths (18-25) n = 207 (1)		Adults (26-65) n= 205 (2)		Retired (66-80) n= 177 (3)		
Variables	M	SD	M	SD	M	SD	Post hoc
Uncertainty	30.23	8.44	34.65	9.08	49.89	10.21	1<2<3
Time/money	41.53	9.14	54.58	10.3	46.35	10.53	1<3<2
Informacion/goal	37.25	10.12	53.56	9.58	43.76	8.47	1<3<2
Consequences	31.34	7.52	36.54	6.38	35.89	6.47	1<2=3
Task factor	136.26	17.54	163.2	19.3	146.2	17.78	1<3<2
Motivation	30.18	6.75	35.75	7.39	36.24	7.31	1<2=3
Emotions	33.46	6.34	24.56	6.53	27.85	6.18	1>3>2
Cognition	37.34	8.36	43.02	7.65	42.65	8.46	1<2=3
Self-regulation	36.53	7.89	43.56	5.87	44.32	7.46	1<2=3
Subject factor	140.34	16.36	148.2	16.3	150.30	15.37	1<2=3
Social pressure	49.36	7.46	41.54	6.39	34.32	8.27	1>2>3
Work pressure	29.53	5.71	39.46	7.83	31.24	7.29	1=3<2
Environmental factor	58.35	11.57	57.79	8.46	53.24	9.37	1=2>3

were also significant differences between the adults and the retired people, taken conjointly, with regard to the youths in the consequences of the decision, motivation, cognition, self-regulation and the decision maker factor, and between the youths and the retired people, taken conjointly, compared to the adults in work pressure.

The data suggest that there are no interactions between sex and age in the participants' responses on the three subfactors assessed by the DMQ: task factor [F (5)= 1.39, p= .23], subject factor, [F (5)= 1.12, p= .35], and environment factor [F (5)= 1.60, p= .16]. That is, the difference between the subjects' means as a function of age does not depend on their sex, because the performance of youths, adults, and retired people on the DMQ is independent of sex.

Summing up, there were significant differences due to sex and age -although there was no interaction between them- in the majority of the variables assessed by the DMQ.

DISCUSSION

This investigation shows that there are significant sex and age differences in the decision processes of the participants of this study. That is, depending on their ages, the participants do not behave in the same way when they make decisions, because the relevance they allocate to the task, the decision maker, and the environmental factors that determine the resolution process is different in some aspects.

Thus, women are more concerned with uncertainty, doubts, and the dynamism that are involved in the decision. They place more value on time and money; they are more concerned about the consequences that may derive from the decision, no matter whether these affect them or other people. Women are more aware of the constraints that the setting and close persons put on them, and their emotions are more important to them in the decision process. Conversely, men assign more importance to the analysis of the information required to carry out the decision and to the definition of the goals or purposes of the decision. They are more motivated during the process and also feel more intensely the pressure from all the work-related aspects.

Another result of this study is that no sex differences were observed in cognition and self-regulation. That is, men and women both carefully process information, retrieve the relevant decision-related data from their memories, categorize the data if they are very diverse, think logically about the alternatives, predict results, evaluate the consequences, solve the problems posed by the situation, and monitor all the decision stages. To some extent, the equivalence in these intellectual aspects in the sample under study shows that sex differences are closer to behavioral styles or to the demands of men and women's social roles than to the intellectual competences or to capacities.

The identification of the sources of differences is a necessary step towards a better understanding of both sexes. Only when these differences are duly localized will society -if it deems it appropriate- be able to search for adequate intervention approaches to change the factors that provoke them. Currently, there is a predominant notion that differences are a product of norms (Tannen, 1990), social status, and certain interested powers imposed on society (Henley & Kramarae, 1991; West & Zimmerman, 1991). However, from the perspective of social psychology, the differences could be considered the result of reciprocal determinism among cognitive, behavioral, and environmental factors. Moreover, behavior, in addition to being influenced by environmental stimuli,

is determined by personal factors, especially beliefs, judgments, and experiences (Bandura, 1986). This author states that one should not look for a specific cause of behavior but instead, he concludes that these three factors (cognitive, behavioral, and environmental) affect behavior in a conjoint but differentiated way, depending on each situation and on the individual.

With regard to age, the post hoc comparisons indicate that the youths felt significant pressure from emotional and social aspects in their decisions, and the adults and the retired persons to a lesser extent. One interpretation of these findings could be that individuals lacking in knowledge and experience in certain decision areas, as occurs in the majority of youths, tend to place little value on the factors that affect the decision and are not aware of the decision's complexity. In contrast, adults and retired persons study these factors more closely and judge the quality of their decisions after undertaking the appropriate strategies (Hershey & Wilson, 1997). This suggests that adults have developed varied and sophisticated ways to contrast the elements that affect a decision, in accordance also with Nakajima and Hotta (1989). These authors found that, in an age interval between 19 and 23 years -smaller than the one of this study- the older individuals used strategies to eliminate certain aspects more frequently than did the younger subjects; that is, they chose a minimum level in a dimension and subsequently compared each alternative with that level.

A age-related characteristic that appears in this study is the absence of differences in cognition and self-regulation between the adults and the retired people. These results, in line with the statements of Dror *et al.* (1998) that age does not degrade the quality or the speed of decisions, in some way contradict the generalized opinion that working memory declines with age, thus limiting older peoples' capacity to monitor decision processes (Charness & Bieman-Copland, 1992; Craik & Salthouse, 1992). Our results may be influenced by the fact that the responses were not associated with any specific domain and, therefore, we could not observe whether the older participants require more time for their decisions or whether they process less information in specific decisions (Riggle & Johnson, 1996). The fact that the retired people's mean age (M= 69.3) was rather low in comparison to the breadth of the interval (66 to 80 years) may also have affected these results. Se espera, en el futuro, aplicar el DMQ haciendo referencia a situaciones específicas.

Upon examining these results, it is noted that this investigation differs in various aspects from other works carried out on sex and age differences in decision making. First, because in this study, the differences were examined taking into account an extensive series of task, decision maker, and environment related variables. In other works, the differences focused on only one decision variable, for example, voting intention. Second, because the study was carried out with a sample that had such a large age interval, where relevant differences among the three developmental stages analyzed are practically unavoidable.

The first aspect, considered a contribution of this work, becomes a limitation when assessing the decision variables in a general instead of a specific way, as it is known that the effects of the illustrative variables on decision factors depend chiefly on the decision domain, which can be diverse (Devolder, Brigham, & Pressley (1990).

For example, it seems that when making decisions about medical treatments, there are no sex (Craw, Meana, Stewart, & Cheung, 2000) or age differences (Weithorn & Campbell, 1982), but there are differences in other areas, such as career choice or marriage.

The limitations of this work also suggest new ways of research. For example: (a) to compare individual sex and age differences in all the factors that determine the resolution process in a specific decision, regardless of whether the sample is of men or women, as in the case of Venkatesh *et al.* (2000), who evaluated sex differences in the area of new technologies, where men are currently more represented than women; (b) to examine sex differences with narrower age intervals, both in the active stage and at retirement; (c) to control thoroughly participants' psychological and social characteristics (there may be notable differences among retired people); and (d) to determine whether there is any relation between sex differences and type of profession, and whether the age differences in the importance assigned to factors that affect decisions can be interpreted from a perspective of general experience -in the sense that as one gets older, one becomes more skilled at making decisions- or from the viewpoint of specific expertise, which suggests that adults and retired people are only more skilled in the domains in which they are more knowledgeable.

To sum up, the results obtained in this study should be replicated, as some of them are different from those reported in previous works. The discussion about differences and similarities between women and men is always a fashionable topic, both in the domain of scientific research and in the public opinion. Sex is an important component of our identity and behaves like a category of thought and behavior.

Notas

Sanz de Acedo Lizarraga, ML, Soria Oliver M & Sanz de Acedo Baquedano MT (2005). *Desarrollo y validación de un Cuestionario de Toma de Decisiones* [Development and validation of a Decision-Making Questionnaire]. Manuscript submitted for publication.

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ANNEXE

EXAMPLES OF ITEMS FROM THE "DECISION-MAKING QUESTIONNAIRE" (DMQ)

SCALES	ITEMS When I make an important decision, for me, it is essential to…	*Not at all important very important*								
Incertainty	Overcome doubtful aspects.	1	2	3	4	5	6	7	8	9
Time/Money Pressure	Organize the actions depending on the time.	1	2	3	4	5	6	7	8	9
Información & Goals	Define the desired goals.	1	2	3	4	5	6	7	8	9
Consequences Decision	Accept responsability for the decision.	1	2	3	4	5	6	7	8	9
Motivation	Be motivated to make decision.	1	2	3	4	5	6	7	8	9
Emotion	Generate emotions that will help me decide.	1	2	3	4	5	6	7	8	9
Cognition	Reflect on the need to make the decision.	1	2	3	4	5	6	7	8	9
Self-Regulation	Plan the actions to be performed.	1	2	3	4	5	6	7	8	9
Social Pressure	Make decisions without external pressure.	1	2	3	4	5	6	7	8	9
Work Pressure	Take the goals of the business into account.	1	2	3	4	5	6	7	8	9

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