Psicothema

Spanish validation of the Delaying Gratification Inventory in adolescents

José P. Espada[1], Miriam Rodríguez-Menchón[1], Alexandra Morales[1], Michael Hoerger[2],
and Mireia Orgilés[1]
[1] Universidad Miguel Hernández, and [2] Tulane University

Abstract

Background: Individual differences in the capacity to delay gratification explain considerable variability in adult life outcomes related to health, psychological well-being, and social relationships. Although individual differences in delay of gratification begin to emerge in adolescence, few studies have tried to evaluate this construct in adolescents, especially in Spanish. The goal of this study was to validate the Delaying Gratification Inventory and to analyse its psychometric properties in Spanish adolescents. **Method:** Using a sample of 695 adolescents (M = 15.18, SD = 1.22) between 13 and 18 years old, the factor structure, internal consistency and reliability were tested. **Results:** The analyses showed an adequate fit to the original model (χ^2 (550) = 1671.59, CFI = .92, TLI = .92, RMSEA = .063, 95% CI [.063, .071]), and appropriate internal consistency (α = .80). The ability to delay gratification was directly and moderately associated with self-control and self-consciousness, and inversely and moderately related with depression and psychological difficulties. **Conclusion:** This study provides new data on a tool for assessing the ability to delay reward in Spanish adolescents, a key regulatory ability to prevent unhealthy high-risk behaviours that are associated with serious health, psychological, and social problems.

Keywords: Delaying gratification, adolescents, psychometric properties, factorial structure, assessment.

Resumen

Validación española del Inventario de Gratificación Demorada en adolescentes. **Antecedentes:** la demora de la recompensa es una habilidad con un papel relevante en conductas de riesgo frecuentes en la adolescencia, como el uso de sustancias o el sexo sin protección. Sin embargo, pocos estudios están dirigidos a evaluar este constructo en adolescentes. El objetivo fue validar el Delaying Gratification Inventory y analizar sus propiedades psicométricas en adolescentes españoles. **Método:** con una muestra de 695 adolescentes de 13 a 18 años (M = 15,18, DT = 1,22) se analizó la estructura factorial, la fiabilidad y la validez del instrumento. **Resultados:** los análisis mostraron un ajuste adecuado al modelo original (χ^2 (550) = 1671,59, CFI = ,92, TLI = ,92, RMSEA = ,06, IC del 95%: [,063, ,071]) y una consistencia interna adecuada (α = ,80). La capacidad de retrasar la gratificación se asoció directa y moderadamente con autocontrol y autoconciencia, e inversa y moderadamente con depresión y dificultades psicológicas. **Conclusión:** este estudio aporta nuevos datos sobre una herramienta válida y fiable para evaluar la capacidad de retrasar la recompensa en adolescentes españoles, una habilidad regulatoria clave para prevenir conductas de riesgo asociadas a problemas graves de salud, psicológicos y sociales.

Palabras clave: demora de la gratificación, adolescentes, propiedades psicométricas, estructura factorial, evaluación.

Delaying of Gratification (DoG) is defined as the willingness to refuse an immediate reward in order to achieve greater long-term gratification (Mischel, 1974; Mischel & Ebbesen, 1970). Delay of Gratification (DG) and Delay Discounting (DD) are often used as equivalent terms but this is not surprising since both capacities coexist in the relevant real decisions and situations experienced by people (Reynolds & Schiffbauer, 2005). The main difference between the both is that while DD would mean the choice of carrying out a specific behaviour (e.g. not ingesting alcohol or not consuming high-calorie foods), the ability to inhibit behaviour in the presence of the immediately available stimulus would be explained by the DoG process (Reynolds & Schiffbauer, 2005). Therefore, DD would explain the initial choice of a behaviour,

and DoG the maintenance of the choice, through the inhibition of impulsive behaviour. In addition, evidence suggests that DoG capacity appears earlier (Reynolds & Schiffbauer, 2005).

Studies conducted over decades have shown stability between DoG and consequent psychological, behavioural, health and economic outcomes from early childhood to mid-life (Mischel et al., 2011). In this sense, there is evidence suggesting that a higher level of DoG is associated with greater self-control and less impulsivity (Casey et al., 2011), better academic performance (Duckworth & Seligman, 2005), and more prosocial behaviour (Krueger, Caspi, Moffitt, & White, 1996). Conversely, if this skill is not developed correctly, legal problems and conflicts may be more likely to arise at school and at home (Herndon & Bembenutty, 2014). In addition, important health problems such as obesity and risky sexual behaviour, as well as other psychological and social problems such as depression, substance abuse, violent and antisocial behaviour, may appear (Herndon, Bembenutty, & Gill, 2015; Hoerger et al., 2011; Seeyave et al., 2009). Moreover, consciousness plays an important role in the ability of DoG since this ability involves conscious and deliberate decision-making

to abandon an immediate pleasure in order to wait for distant gratification (Baumeister, Heatherton, & Tice, 1994). In this sense, it would be necessary to be aware of the future positive consequences of inhibiting impulsive behaviour (Renn, Allen, Fedor, & Davis, 2005). For this reason, DoG is associated with greater self-control and less impulsivity (Arce & Santisteban, 2006; Casey et al., 2011), and is considered an operative indicator of impulsivity (Forstmeier, Drobetz, & Maercker, 2011).

Adolescence is a critical stage of development because sensation-seeking and experimentation of risk behaviours are common, leading to a greater likelihood of engaging in unhealthy behaviours (Herrero, Ordóñez, Salas, & Colom, 2002; Reyna & Wilhems, 2017), for example, use of tobacco, alcohol, and other drugs (Romer, Duckworth, Sznitman, & Park, 2010). Therefore, the development of self-regulatory skills is essential, especially the ability to delay gratification (Bembenutty, Cleary, & Kitsantas, 2013). According to some studies, girls are more skilled in self-regulation, although these differences tend to be small (Hoerger et al., 2011; Silverman, 2003).

By determining risk behaviours in adolescence, the DoG paradigm can provide a comprehensive view (Forstmeier et al., 2011; Levesque, 2011). To assess DoG, self-reports provide numerous advantages including low cost, quickness, and the ability to recruit large samples (Hoerger et al., 2011). Nevertheless, some of the DoG scales have some limitations (Liu, Wang, & Jiang, 2013) to support a one-dimensional structure (e.g., General Delay of Gratification Questionnaire [GDGQ]; Ray & Najman, 1986). Many different situations require processes of self-control and self-regulation. In addition, people may show different levels of self-control depending on the context. Liu et al. (2013) underline the need to use a questionnaire that evaluates the delay of gratification with a multidimensional structure, allowing, in turn, to better understand its conceptual structure.

The Delaying Gratification Inventory (DGI) was created and validated by Hoerger et al. (2011) with adults from the USA, Canada, Mexico, Europe, Asia, Australia, South America and Africa. This multifactorial inventory was developed to assess the ability to delay gratification across five domains: food, physical pleasures, social interactions, money and achievements, which had been the focus of previous research (Hoerger et al., 2011). It is a unique instrument that measures both the capacity for general self-regulation and the specific capacity in different areas (Mahoney & Lawyer, 2018). The DGI has recently been adapted with adult population in Poland (Dymek & Jurek, 2018), where the five-factor structure was confirmed, and in Brazil, validity and reliability evidences were provided (Jardim-de-Paula, Arantes-Porto, & de Souza-Costa, 2018).

Researchers have found difficulties evaluating DoG in adolescents, for example through Marshmallow test, because it is difficult to find sufficiently attractive immediate reinforcements (Levesque, 2011; Wulfert, Block, Santa Ana, Rodríguez, & Colsman, 2002). The lack of validated instruments to be used with Spanish adolescents from community samples have generated a gap and in the field. The aim of the present study was to analyse the psychometric properties of the DGI with Spanish adolescents, studying its evidences of validity in relation to other variables, factor structure, internal consistency and test-retest reliability. A second objective was to analyse differences according to gender and age. An adequate fit to the five-factor model proposed by the DGI authors was expected, as well as evidences of internal consistency, temporal stability (test-retest) and validity in relation to other variables. Greater ability to delay gratification was expected among girls, in accordance with previous studies, as well as levels of DoG ability increasing with age.

Method

Participants

Six hundred and ninety-five scholars aged between 13 and 18 (M = 15.18, SD = 1.22) participated (49.9% female). They were recruited from two public high schools in the southeast of Spain from two different geographical areas, selected by convenience sampling. Participants' distribution according to age was: 13 years (8.3%), 14 years (22.9%), 15 years (28.8%), 16 years (25.7%), 17 years (11.4%), and 18 years (2.9%). The majority of them have Spanish nationality (91.5%). Regarding the socioeconomic level, 32.7% belonged to families with a low socioeconomic level, 39.4% medium socioeconomic level and 27.0% high socioeconomic level. Two months later, a subsample of 307 participants (44.2%) participated to test the temporal stability of the DGI. Of these participants 47.2% were female and the average age was 15.46 (SD = 1.08). There was equivalence between the retest sample and those who were not involved in the second assessment in gender, nationality, and scores on the DGI and its subscales (p >.05). Group differences were found in age ($p \leq .001$) and socio-economic level ($p \leq .001$). The participants who were not involved in the retest were younger (d = .43) and more frequently belonged to a low socio-economic level (d = .40) than those who were involved in the retest.

Instruments

Delaying Gratification Inventory (DGI; Hoerger et al., 2011). This is a self-report composed of 35 items that evaluates delayed gratification about 5 factors (food, physical pleasures, achievements, social interactions and money). Responses are rated on a 5-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Higher scores indicate better capacity for self-regulation to delay immediate gratification and achieve greater long-term gratification. The internal consistency of this scale in the original study is adequate (Cronbach's α = .91; Hoerger et al., 2011).

After obtaining the authors' consent, The Spanish version of the DGI was developed following the guidelines of Muñiz, Elousa, and Hambleton (2013) and of the International Test Commission (2017) and some recommendations of the AERA, APA, and NCME (2014). Two bilingual psychologists were in charge of the translation. One of them translated the scale into Spanish and then the other one translated it back into English. Both had knowledge of the culture into which the scale was adapted to make sure that the last version was culturally appropriate. The process was completed after correcting minor differences detected between the two versions with a third researcher (Table 1).

Family Affluence Scale III (FAS-III; Torsheim et al., 2016). This scale assesses the socio-economic status of participants, including participants from different countries. The answers to 6 questions offer a total score and classify the socio-economic level as low (20%), medium (60%) and high economic affluence (20%) (Meinck, Cosma, Mikton, & Baban, 2017).

Table 1
Spanish version of the Delaying Gratification Inventory (DGI; Hoerger, Quirk & Weed, 2011)

Food

1 I can resist junk food when I want to [Soy capaz de no comer comida basura si me lo propongo]

6 I would have a hard time sticking with a special, healthy diet* [Me resultaría difícil seguir una dieta saludable]

11 If my favorite food were in front of me, I would have a difficult time waiting to eat it* [Si tuviera delante mi comida favorita me resultaría difícil esperar a poder comérmela]

16 It is easy for me to resist candy and bowls of snack foods [Me resulta fácil no comer dulces y snacks]

21 Sometimes I eat until I make myself sick*

[A veces como hasta ponerme enfermo]

26 I have always tried to eat healthy because it pays off in the long run [Siempre intento comer de forma saludable porque compensa a largo plazo]

31 Even if I am hungry, I can wait until it is meal time before eating something [Incluso si tengo hambre, puedo esperar sin comer hasta que sea la hora de la comida]

Physical

2 I am able to control my physical desires [Soy capaz de controlar mis deseos físicos]

7 I like to get to know someone before having a physical relationship [Me gusta conocer a otra persona antes de tener una relación física/íntima con ella]

12 My habit of focusing on what "feels good" has cost me in the long run* [Me resulta difícil mantener hábitos de vida saludables]

17 I have given up physical pleasure or comfort to reach my goals [Soy capaz de sacrificar la comodidad y el placer físico para alcanzar mis objetivos]

22 I prefer to explore the physical side of romantic involvements right away* [En las relaciones amorosas prefiero pasar pronto al contacto físico]

27 When faced with a physically demanding chore, I always tried to put off doing it* [Cuando tengo que hacer alguna tarea física dura, intento dejarla para más tarde]

32 I have lied or made excuses in order to go do something more pleasurable* [He mentido o he puesto excusas para no hacer algo que no me apetecía]

Social

3 I hate having to take turns with other people* [Odio tener que esperar mi turno]

8 Usually I try to consider how my actions affect others [Normalmente tengo en cuenta cómo afectan a los demás las cosas que hago]

13 I think that helping each other benefits society* [Creo que ayudándonos unos a otros mejoramos la sociedad]

18 I try to consider how my actions will affect other people in the long-term [Intento tener en cuenta cómo las cosas que hago pueden afectar a largo plazo a otras personas]

23 I do not consider how my behaviour affects other people* [No tengo en cuenta cómo afecta a otras personas mi comportamiento]

28 I value the needs of other people around me [Me importan las necesidades de las personas que me rodean]

33 There is no point in considering how my decisions affect other people* [No tiene sentido pararme a pensar cómo mis decisiones afectan a otras personas]

Money

4 When I am able to, I try to save away a little money in case an emergency should arise [Cuando puedo, intento ahorrar algo de dinero por si surge una emergencia]

9 It is hard for me to resist buying things I cannot afford* [Me cuesta resistirme a comprar cosas que no me puedo permitir económicamente]

14 I try to spend my money wisely [Intento gastar el dinero de forma inteligente]

19 I cannot be trusted with money* [No se me puede fiar dinero]

24 When someone gives me money, I prefer to spend it right away* [Cuando alguien me da dinero prefiero gastarlo enseguida]

29 I manage my money well [Administro bien mi dinero]

34 I enjoy spending money the moment I get it* [Disfruto gastando dinero en el momento en el que lo obtengo]

Achievement

5 I worked hard in school to improve myself as a person [Me esfuerzo en mis estudios para mejorar como persona]

10 I have tried to work hard in school so that I could have a better future [Intento esforzarme en los estudios para tener un futuro mejor]

15 In school, I tried to take the easy way out* [En el instituto trato de esforzarme lo justo]

20 I am capable of working hard to get ahead in life [Soy capaz de esforzarme mucho para salir adelante en la vida]

25 I cannot motivate myself to accomplish long-term goals* [Me cuesta motivarme para perseguir objetivos a largo plazo]

30 I have always felt like my hard work would pay off in the end [Creo que si trabajo duro mereceré la pena en el futuro]

35 I would rather take the easy road in life than get ahead* [Creo que es mejor tomar la alternativa más fácil antes que esforzarse y progresar en la vida]

Note: * indicates reverse-coded item

Children's Depression Inventory (CDI; Kovacs, 1992). This instrument is composed of 27 items that evaluate depressive symptoms (depressed mood, social problems, and low self-esteem, among others). The response alternatives indicate normality or absence of the symptom (0); some frequency or intensity (1); or unequivocal presence of the symptom (2). The maximum possible score is 54, and higher scores indicate greater depressive symptoms. The internal consistency in the present study was $\alpha = .86$.

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). This scale consists of 25 items that evaluate four difficulties (emotional problems, behavioural problems, hyperactivity, and peer problems) and one strength (prosocial behaviour). Responses are rated on a 3-point Likert scale. Internal consistency in this study was moderate (Cronbach's α with this sample = .75).

Brief Self-Control Scale (BSCS; Tangney, Baumeister, & Boone, 2004). This 13-item scale evaluates self-control, using a 5-point Likert scale ranging from 1 (*Not at all*) to 5 (*A lot*). A higher score suggests a greater capacity for self-control. It

presented moderate internal consistency in our study (Cronbach's $\alpha = .75$).

Adolescent Self-Consciousness Questionnaire (ASC; Nie & Ding, 2009). This instrument consists of 67 items that evaluate self-consciousness according to three factors: self-control, self-knowledge and self-experience. Responses are rated on a 5-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Higher scores indicate a higher level of self-consciousness. The internal consistency found in the present study was adequate (Cronbach's $\alpha = .82$).
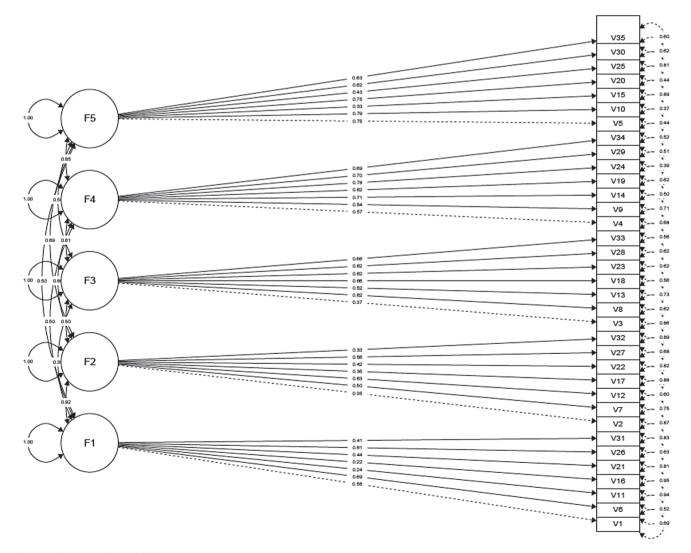
Procedure

The objectives of the study were presented in an e-mail newsletter to the principals of three secondary schools. After two of them had accepted to participate, the informed consents were distributed to the parents. The participation rate in the study was very high (approximately 96%). The surveys were administered

across two tutoring sessions (50 min.) in groups of 10 to 33 adolescents. Two months later, a subsample again completed the scale in order to check its temporal stability. The ethics committee of the Miguel Hernández University approved this study (REF. DPS.JPE.01.18).

Data analysis

Descriptive analyses were conducted for each item of the DGI: means, standard deviation, the discrimination or homogeneity index of each item and internal consistency if the item is removed. We tested using Confirmatory Factorial Analysis (CFA) the factorial structure of the DGI proposed by the original authors (Hoerger et al., 2011). Diagonally Weighted Least Square (DWLS) estimator was used because of its appropriateness with ordinal data, or when the principle of normality is not met (Li, 2016). An adequate adjustment of the model was determined by values greater than .90 for CFI and TLI, and less than .08 for RMSEA, as suggested by Bentler (1989).

Because of the ordinal nature of the data, ordinal α was used to test the reliability of the Spanish version of the questionnaire.

Values above .90 were considered excellent, between .70 and .90 were high, between .50 and .70 were moderate and lower than .50 were low (Hinton, Brownlow, McMurray, & Cozens, 2004). Temporal stability of the DGI was calculated using a subsample of 307 participants (44.2%). The inter-assessment interval was approximately two months. We obtained intraclass correlation coefficients (ICC). Attrition analyses between the test-retest subsample and the entire sample were calculated. We tested the equivalence in socio-demographic variables, scores in DGI, BSCS, ASC, CDI and SDQ between both groups. Because of the ordinal nature of the data (Khamis, 2008), Spearman correlations between the DGI and self-control (BSCS), self-consciousness (ASC), difficulties (SDQ) and depressive symptoms (CDI) were calculated in order to provide evidence of validity for the DGI. Considering the possible impact of the adolescents' gender and age on delaying gratification a two-way ANOVA was conducted. All analyses were performed with the Statistical Package for Social Sciences (SPSS, v25), except for the CFA and ordinal α, which were calculated with the Lavaan package in *R* Studio (R Studio Team, 2016).

Figure 1. Factor loadings of CFA

Results

Confirmatory Factorial Analysis

Figure 1 presents the results derived from the CFA of the DGI. The overall fit of the 5-factor structure of the DGI was adequate: $\chi^2_{(550)} = 1671.59$; CFI = .92, TLI = .92, RMSEA = .067, 95% CI [.063, .071]. Loadings of each item to its corresponding factor was higher than .30, except for items 11 "If my favorite food were in front of me, I would have a difficult time waiting to eat it" (.24) and 16 "It is easy for me to resist candy and bowls of snack foods" (.22).

Internal Consistency and Test-retest Reliability

Table 2 shows the properties of the items and reliability of the Spanish version of DGI.

Most of the discrimination index were higher than .20 in all items, a criterion considered optimal by Briggs and Cheek (1986). The removal of the items with the lowest discrimination index (items 3, 11, 15 and 16) did not increase the reliability. However, the contents evaluated through these items were considered relevant to represent the construct. Therefore, the 35 original items were kept in the final version. The internal consistency of the Spanish version of the DGI was good ($\alpha = .80$). The internal consistency of the subscales of the DGI was good for Money ($\alpha = .82$), adequate for Achievement ($\alpha = .77$) and adequate but with same shortcomings for Food ($\alpha = .61$), Physical ($\alpha = .60$) and Social subscales ($\alpha = .60$).

A subsample of 307 participants (44.2%) was selected to test the temporal stability of the DGI. According to the European model for the evaluation of the quality of the tests (CET-R) (Hernández, Ponsoda, Muñiz, Prieto, & Elosua, 2016), we found a good test-retest reliability of the DGI for the total score (ICC = .76). An adequate temporal stability was found for Money (ICC = .67) and Achievement (ICC = .68) subscales. An adequate temporal stability, but with same shortcomings, for Food (ICC = .59) and Physical (ICC = .61) subscales, and inadequate one for Social subscale (ICC = .54).

Correlations between Subscales

All the correlations between DGI subscales were direct, moderate and significant for a level below .01 (Table 3). The highest correlations were found between Achievement and Money (*rho* = .48), and Achievement and Physical Pleasure (*rho* = .47). The lowest correlations were found between Social Interactions and Food (*rho* = .15), and Social Interactions and Physical Pleasure (*rho* = .26). The total score of DGI was more highly correlated to Money, Physical pleasure and Achievement (*rho* = .70, .76), compared to Food and Social Interactions subscales (*rho* = .52, .60).

Association between the DGI and other variables

Evidence of convergent validity was obtained by direct and moderate correlations between BSCS, ASC and DGI, both by subscale and by total score (Table 4). Evidence of divergent validity was found by indirect and moderate correlations between CDI, SDQ and DGI. All the correlations analyzed were significant for a level lower than .01, except for the correlation between the

Table 2
Psychometric characteristics of the DGI

	M	SD	DI	α-i
Item 1	3.54	1.36	.29	.79
Item 2	3.45	1.24	.36	.78
Item 3	2.71	1.07	.16	.79
Item 4	3.50	1.05	.35	.78
Item 5	3.39	0.88	.43	.79
Item 6	2.95	1.14	.35	.79
Item 7	3.86	0.86	.30	.79
Item 8	3.37	0.77	.28	.79
Item 9	3.21	1.08	.34	.79
Item 10	3.70	0.76	.42	.78
Item 11	2.07	1.21	.17	.80
Item 12	3.02	1.03	.42	.78
Item 13	4.40	0.77	.28	.78
Item 14	3.66	0.86	.48	.78
Item 15	2.48	1.09	.18	.80
Item 16	2.67	1.15	.12	.79
Item 17	3.07	1.10	.31	.79
Item 18	3.23	0.87	.33	.79
Item 19	3.96	0.84	.39	.78
Item 20	3.77	0.71	.49	.78
Item 21	3.71	1.03	.25	.79
Item 22	3.32	0.96	.32	.79
Item 23	3.26	0.98	.33	.78
Item 24	3.69	0.85	.54	.78
Item 25	2.81	1.19	.32	.79
Item 26	2.87	0.95	.35	.79
Item 27	3.08	1.08	.39	.78
Item 28	3.54	0.73	.34	.79
Item 29	3.35	1	.45	.78
Item 30	4.06	0.62	.34	.79
Item 31	3.20	1.07	.22	.79
Item 32	2.11	1.14	.30	.79
Item 33	3.39	0.97	.38	.78
Item 34	3.31	1.12	.47	.78
Item 35	3.55	0.91	.42	.78

Factors	*M*	*SD*	α ordinal	**ICC (CI)**
F1. Food				
Boys	23.18	4.59		
Girls	23.09	4.64		.59
Total	23.14	4.61	.61	(.48, .67)
F2. Physical				
Boys	24.13	3.92		
Girls	23.36	4.34		.61
Total	24.13	4.14	.60	(.51, .69)
F3. Social				
Boys	23.36	3.52		
Girls	23.79	3.82		.54
Total	23.58	3.68	.60	(.26, .71)
F4: Money				
Boys	27.21	5.19		
Girls	27.82	4.96		.67
Total	27.53	5.08	.82	(.59, .74)
F5: Achievement				
Boys	26.19	4.44		
Girls	26.54	3.92		.68
Total	26.37	4.18	.77	(.60, .74)
DGI Total score				
Boys	125.66	15.82		
Girls	127.45	15.78		.76
Total	126.59	15.81	.80	(.57, .85)

Note: M: Mean; *SD:* Standard Deviation; DI: discrimination index; α-I: ordinal α if the item is removed; $\alpha_{ordinal}$: Ordinal α; ICC =Intraclass Correlation; CI = Confidence Interval; Total: DGI total score. Range for subscales: 5-25; Range for overall score: 35-175

CDI and the Social Interactions subscale of the DGI (*p* < .05). Correlations ranged in magnitude from -.39 to .59.

Gender and Age Differences

No gender differences were found in any of the subscales: Food (*t* = .63, *p* >.05), Physical Pleasure (*t* = -.06, *p* >.05), Social Interactions (*t* = -1.67, *p* >.05), Money (*t* = -.81, *p* >.05) and Achievement (*t* = -1.35, *p* >.05), or in the total DGI score (*t* = .88, *p* >.05). Age was not significantly related to the scores in the DGI (*p* >.05) (Table 4). In two-way ANOVA (gender and age) analyses we did not find any interaction effect between gender and age with the overall DGI scores and its subscales (*p* >.05). Gender and age were not independently related to the scores in the DGI and its subscales (*p* >.05).

Discussion

The aim of this study was to examine the psychometric properties of the DGI in Spanish adolescents and validate its use. The results indicated an adequate fit to the five-factor model, moderate and adequate indices of internal consistency and test-retest reliability, as well as evidence of validity. No significant differences were found in the DGI by gender and age. Overall, the results suggest that the DGI can be reasonably used with Spanish adolescents, which may facilitate future research aimed at understanding and improving their longer-term health, psychological, and relationship outcomes.

The results derived from the CFA indicated an adequate fit of the Spanish version of the DGI to the original model. The validation carried out in Poland (Dymek & Jurek, 2018) showed an adequate

fit of the five-factor model, after the elimination of item 3. In the present study, items 3, 11, 15 and 16 presented low discrimination index; however, the removal of these items did not increase the reliability of the scale. Based on a clinical perspective, the contents evaluated thought these items were considered relevant for evaluating the construct. Items 11 and 16 showed the lowest factor loadings. After removing both (11 and 16) from the CFA, the model adjustment did not improve. Finally, the 35 items of the DGI were kept, which is an advantage to future cross-cultural studies using the original version.

Total internal consistency was good (α = .80) in line with the Poland (α = .85; Dymek & Jurek, 2018), slightly lower compared to the excellent reliability in the version developed in the USA (α = .91; Hoerger et al., 2011), and slightly higher than the version adapted in Brazil with an adequate reliability (α >.70 (Jardim-de-Paula, et al., 2018). The internal consistency of the subscales was slightly lower (.60 to .82), although similar to the reported data in the Polish validation (.67 to .80, except for physical subscale, whose value was .56) (Dymek & Jurek, 2018). This may be due to the attempt to maintain the essence of items originally designed for the adult population. It might be advisable to re-word the items according to characteristics and lifestyles typical of adolescence. The test-retest reliability index obtained was good (ICC = .76), but slightly lower than that obtained in the Polish sample, that was excellent (*r* = .85; Dymek & Jurek, 2018). These results could be due to the differences found in age and socio-economic level between the participants of the total sample and the subsample that participated in the retest evaluation. Either way, as suggested by some authors, the evidence obtained about test-retest stability seems to be a better predictor of the real stability of the instrument (McCrae, Kurtz, Yamagata, & Terracciano, 2011), and this index was placed in good terms (ICC =.76), according to Hernández et al. (2016).

On the one hand, adolescents who showed greater ability to delay gratification, inhibiting impulsive behavior, showed higher levels of self-control and self-consciousness. On the other hand, those young people with a lower DoG level showed to a greater extent depressive symptoms and difficulties in different areas including emotional problems -anxiety and depression- and behavioral problems.

Although some research supports greater self-regulatory capacity in girls (Hoerger et al., 2011; Silverman, 2003), no gender differences were found in this study. However, these results are in line with what was found by Wulfert et al. (2002). These authors observed small gender differences in the ability to delay gratification in a sample of children, but not in an adolescent sample. A plausible

Table 3
Correlations among subscales of the DGI and age

	F1	F2	F3	F4	F5	F6
F1. Food	1	.40**	.15**	.32**	.28**	.60**
F2. Physical		1	.26**	.44**	.47**	.75**
F3. Social			1	.42**	.31**	.52**
F4. Money				1	.48**	.76**
F5. Achievement					1	.70**
F6. Total						1

F1: Food; F2: Physical; F3: Social; F4: Money; F5: Achievement; F6: overall score
* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)

Table 4
Means (M) and standard deviation (SD) for related measures to DGI and Spearman correlations among the DGI and adolescents' age, and the measures BSCS, ASC, CDI and SDQ

	M (SD)	Range	Food	Physical	Social	Money	Achievement	Total score
Age	15.18 (1.22)	13-18	-.03	-.06	-.06	-.07	-.04	-.01
BSCS	40.83 (7.84)	5-65	.31**	.53**	.27**	.41**	.49**	.59**
ASC	235.46 (28.65)	67-335	.27**	.45**	.24**	.32**	.51**	.51**
CDI	12.68 (6.87)	0-54	-.15**	-.30**	-.08*	-.19**	-.36**	-.32**
SDQ	12.42 (5.37)	0-40	-.19**	-.35**	-.17**	-.29**	-.39**	-.41**

BSCS: Brief Self-Control Scale; ASC: Adolescent Self-Consciousness Questionnaire; CDI: Children's Depression Inventory; SDQ: Strengths and Difficulties Questionnaire
* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)

explanation of this result may be the differences in socialization, in which girls are educated to "inhibit" their impulses, but as they grow and increase their independence, this inhibition of behavior may decrease (Wulfert et al., 2002). Nevertheless, they noticed that the sample size was small and, therefore this explanation requires more empirical support. In the same line, the initial hypothesis indicating that higher levels of gratification delay are found as age increased was not supported. One possible explanation is that other reference studies include broader age ranges involving early adulthood (Göllner, Ballhausen, Kliegel, & Forstmeier, 2018), and it might be expected a greater ability to delay gratification at a later age. The present study focuses on a very limited age range (13-18 years old), which the need for social approval and acceptance in adolescence would imply less inhibition of behaviour in the presence of immediate availability of the stimulus (e.g. alcohol or tobacco). In addition, cognitive immaturity, as well as the scarcity of experiences that favor rational judgments, may lead the adolescent to underestimate risks and become more involved in risky behaviors and sensation-seeking (Greene, Krcmar, Walters, Rubin, & Hale, 2000; Reyna & Wilhems, 2017).

Mean scores of the DGI in Spanish adolescents were similar to those found in the original study (Hoerger et al., 2011), in the Polish version (Dymek & Jurek, 2018) and in the Brazilian version (Jardim-de-Paula et al., 2018). However, these findings cannot be interpreted due to the age disparity of the participants. Cross-cultural studies are needed to understand and compare differences in the ability to delay gratification in adolescents from different countries, contributing to our understanding (Forstmeier et al., 2011; Levesque, 2011).

This work presents some limitations, among which is the non-random procedure for the selection of participants, which could hinder generalization of the results. In the original study (Hoerger et al., 2011) the scale was completed on the Internet, which favoured

obtaining a very large sample size from different geographical regions. However, as we used translated and culturally adapted instrument in our study, we decided to carry out this evaluation phase in person, thus ensuring the comprehension of the items. The DGI includes inverted items, which can reduce the acquiescence bias in the response. However, the combination of positive and negative items in the same test is a practice that may negatively affect the results because it deteriorates reliability, and the unidimensionality of the test is compromised by secondary sources of variance (Suárez-Álvarez et al., 2018). Future longitudinal studies can contribute greater knowledge of the suitability of this instrument over time and at different ages. This would also extend the empirical evidence about the capacity to delay gratification and its association with other variables or psychological problems of great importance at these ages (Forstmeier et al., 2011).

The results of this study show that the DGI is a valid and reliable instrument for assessing delayed gratification in the Spanish adolescent population. The availability and use of appropriate assessment instruments could contribute to a better understanding and detection of deficits in the ability to delay gratification, implicated in a multitude of clinical problems such as substance abuse, risky sexual behaviours, hypomanic symptoms, behavioural problems, pathological gambling, and eating disorders (Hoerger, et al., 2011; Mahoney & Lawyer, 2018).

Acknowledgements

References

AERA, APA, & NCME (2014). *Standards for educational and psychological tests*. Washington DC: American Educational Research Association.

Arce, E., & Santisteban, C. (2006). Impulsivity: A review. *Psicothema, 18*(2), 213-220.

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. New York: Academic Press.

Bembenutty, H., Cleary, T. J., & Kitsantas, A. (2013). *Applications of self-regulated learning across diverse disciplines: A tribute to Barry J. Zimmerman*. Charlotte, NC: Information Age Publishing.

Bentler, P. M. (1989). *EQS structural equations program manual*. Los Angeles, CA: BMDP Statistical Software.

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the evaluation of personality scales. *Journal of Personality, 54*, 106-148. doi:10.1111/j.1467-6494.1986.tb00391.x

Casey, B. J., Somerville, L. H., Gotlib, I. H., Ayduk, O., Franklin, N. T., Askren, M. K.,… & Shoda, Y. (2011). Behavioral and neural correlates of delay of gratification 40 years later. *Proceedings of the National Academy of Sciences of the United States of America, 108*(36), 14998-15003. doi:10.1073/pnas.1108561108

Duckworth, A., & Seligman, M. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science, 16*(12), 939-944. doi:10.1111/j.1467-9280.2005.01641.x

Dymek, A., & Jurek, P. (2018). Polish Validation of the Delaying Gratification Inventory. *Polish Psychological Bulletin, 49*(1), 107-117. doi:10.24425/119477

Forstmeier, S., Drobetz, R., & Maercker, A. (2011). The delay of gratification test for adults: Validating a behavioral measure of self-motivation in a sample of older people. *Motivation and Emotion, 35*, 118-134. doi:10.1007/s11031-011-9213-1

Göllner, L. M., Ballhausen, N., Kliegel, M., & Forstmeier, S. (2018). Delay of Gratification, Delay Discounting and their Associations with Age, Episodic Future Thinking, and Future Time Perspective. *Frontiers in Psychology, 8*, 2304. doi:10.3389/fpsyg.2017.02304

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 38*, 581-586. doi:10.1111/j.1469-7610.1997.tb01545.x

Greene, K., Krcmar, M., Walters, L. H., Rubin, D. L., & Hale, J. L. (2000). Targeting adolescent risk-taking behaviors: The contribution of egocentrism and sensation-seeking. *Journal of Adolescence, 23*, 439-461. doi:10.1006/jado.2000.0330

Hambleton, R. K. (2005). Issues, designs, and technical guidelines for adapting tests into multiple languages and cultures. In R. K. Hambleton, P. F. Merenda & C. Spielberger (Eds.), *Adapting educational and psychological tests for cross-cultural assessment* (pp. 3-38). London: L.E.A.

Hernández, A., Ponsoda, V., Muñiz, J., Prieto, G., & Elosua, P. (2016). Revisión del modelo para evaluar la calidad de los test utilizados en España. *Papeles del Psicólogo, 37*, 192-197.

Herndon, J. S., & Bembenutty, H. (2014). In-school and social factors influencing learning among students enrolled in a disciplinary

alternative school. *Learning and Individual Differences, 35*, 49-55. doi:10.1016/j.lindif.2014.07.007

Herndon, J. S., Bembenutty, H., & Gill, M. G. (2015). The role of delay of gratification, substance abuse, and violent behavior on academic achievement of disciplinary alternative middle school students. *Personality and Individual Differences, 86*, 44-49. doi:10.1016/j.paid.2015.05.028

Herrero, O., Ordóñez, F., Salas, A., & Colom, R. (2002). Adolescencia y comportamiento antisocial. *Psicothema, 14*(2), 340-343.

Hinton, P. R., Brownlow, C., McMurray, I., & Cozens, B. (2004). *SPSS Explained*. London: Routledge Taylor & Francis Group.

Hoerger, M., Quirk, S. W., & Weed, N. C. (2011). Development and Validation of the Delaying Gratification Inventory. *Psychological Assessment, 23*(3), 725-738. doi:10.1037/a0023286

International Test Commission (2017). *The ITC Guidelines for Translating and Adapting Tests*. Retrieved from www.InTestCom.org

Jardim-de-Paula, J., Arantes-Porto, A., & de Souza-Costa, D. (2018). Brazilian version of the Delaying Gratification Inventory (DGI): transcultural adaptation, evidences of validity and reliability. *Revista Interdisciplinar Ciencias Médicas, 2*(2), 29-35.

Khamis, H. (2008). Measures of association: How to choose? *Journal of Diagnostic Medical Sonography, 24*(3), 155-162. doi:10.1177/8756479308317006

Kovacs, M. (1992). *Children's Depression Inventory, CDI*. Toronto: Multi-Health Systems, Inc.

Krueger, R., Caspi, A., Moffitt, T. E., & White, J. (1996). Delay of gratification, psychopathology, and personality: Is low self-control specific to externalizing problems? *Journal of Personality, 64*(1), 107-129. doi:10.1111/j.1467-6494.1996.tb00816.x

Levesque, J. R. (2011). *Encyclopedia of Adolescence*. Indiana University, Bloomington: Springer.

Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavioral Research Methods, 48*, 936-949. doi:10.3758/s13428-015-0619-7

Liu, X., Wang, L., & Jiang, J. (2013). Generalizability of delay of gratification: Dimensionality and function. *Psychological Reports, 113*, 464-485. doi:10.2466/03.09.PR0.113x20z6

Mahoney, C. T., & Lawyer, S. R. (2018). Domain-Specific Relationships in Sexual Measures of Impulsive Behavior. *Archives of Sexual Behavior, 47*(6), 1591-1599. doi:10.1007/s10508-018-1210-y

McCrae, R. R., Kurtz, J. E., Yamagata, S., & Terracciano, A. (2011). Internal consistency, retest reliability, and their implications for personality scale validity. *Personality and Social Psychology Review, 15*, 28-50. doi:10.1177/1088868310366253

Meinck, F., Cosma, A. P., Mikton, C., & Baban, A. (2017). Psychometric properties of the Adverse Childhood Experiences Abuse Short Form (ACE-ASF) among Romanian high school students. *Child Abuse & Neglect, 72*, 326-337. doi:10.1016/j.chiabu.2017.08.016

Mischel, W. (1974). Processes in Delay of Gratification. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (vol. 7, pp. 249-292). New York: Academic Press. doi:10.1016/S0065-2601(08)60039-8

Mischel, W., Ayduk, O., Berman, M. G., Casey, B. J., Gotlib, I. H., Jonides, J.,… Shoda, Y. (2011). 'Willpower' over the life span: Decomposing

self-regulation. *Social Cognitive Affective Neuroscience, 6*(2), 252-256. doi:10.1093/scan/nsq081

Mischel, W., & Ebbesen, E. B. (1970). Attention in Delay of Gratification. *Journal of Personality and Social Psychology, 16*(2), 329-337. doi:10.1037/h0029815

Muñiz, J., Elosua, P., & Hambleton, R. K. (2013). Directrices para la traducción y adaptación de los tests: segunda edición [Guidelines for translation and adaptation of tests: Second edition]. *Psicothema, 25*(2), 151-157. doi:10.7334/psicothema2013.24

Nie, Y. G., & Ding, L. (2009). The characters of adolescent self-consciousness and its relationship with social adaptive behavior. *Psychological Development and Education, 25*, 47-54.

R Studio Team (2016). *R Studio: Integrated Development for R*. Boston, MA: RStudio, Inc.

Ray, J., & Najman, J. (1986). The generalizability of deferment of gratification. *The Journal of Social Psychology, 126*, 117-119. doi:10.1080/00224545.1986.9713578

Renn, R. W., Allen, D. G., Fedor, D. B., & Davis, W. D. (2005). The roles of personality and self-defeating behaviors in self-management failure. *Journal of Management, 31*, 659-679. doi:10.1177/0149206305279053

Reyna, V. F., & Wilhelms, E. A. (2017). The gist of delay of gratification: Understanding and predicting problem behaviors. *Journal of Behavioral Decision Making, 30*(2), 610-625. doi:10.1002/bdm.1977

Reynolds, B., & Schiffbauer, R. (2005). Delay of gratification and delay discounting: A unifying feedback model of delay-related impulsive behavior. *The Psychological Record, 55*, 439-460. doi:10.1007/BF03395520

Romer, N. D., Duckworth, A. L., Sznitman, S., & Park, S. (2010). Can adolescents learn self-control? Delay of gratification in the development of control over risk taking. *Prevention Science, 11*(3), 319-330. doi:10.1007/s11121-010-0171-8

Seeyave, D. M., Coleman, S., Appugliese, D., Corwyn, R. F., Bradley, R. H., Davidson N. S.,… Lumeng, J. C. (2009). Ability to delay gratification at age 4 years and risk of overweight at age 11 years. *Archives of Pediatrics and Adolescent Medicine, 164*, 631-635. doi:10.1001/archpediatrics.2009.12

Silverman, I. W. (2003). Gender differences in delay of gratification: A meta-analysis. *Sex Roles, 49*, 451-463.

Suárez-Álvarez, J., Pedrosa, I., Lozano, L., García-Cueto, E., Cuesta, M., & Muñiz, J. (2018). Using reversed items in Likert scales: A questionable practice. *Psicothema, 30*, 149-158. doi:10.7334/psicothema2018.33

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*, 271-322. doi:10.1111/j.0022-3506.2004.00263.x

Torsheim, T., Cavallo, F., Levin, K. A., Schnohr, C., Mazur J., Niclasen B.,… Currie, C. (2016). Psychometric Validation of the Revised Family Affluence Scale: A Latent Variable Approach. *Child Indicators Research, 9*(3). doi:10.1007/s12187-015-9339-x

Wulfert, E., Block, J. A., Ana, E. S., Rodríguez, M. L., & Colsman, M. (2002). Adolescent delay of gratification. Impulsive choices and problem behaviors in early and late adolescence. *Journal of Personality, 70*(4), 533-552. doi:10.1111/1467-6494.05013