



GENERALIZABILITY OF DELAY OF GRATIFICATION: DIMENSIONALITY AND FUNCTION¹

XIAOYAN LIU, LEI WANG, AND JING JIANG

—There is a debate about the factor structure of adults' ability to delay gratification and mixed findings concerning the relationship between delay of gratification and achievement. Three studies were conducted to show that delay of gratification had two components. In Study 1, exploratory factor analyses showed that the Generalizability of Deferment of Gratification Questionnaire had two factors: Controlling-Impulse and Planning-and-Waiting. Study 2 verified the two-factor structure by confirmatory factor analysis and demonstrated acceptable reliability, construct and divergent validity. Specifically, Planning-and-Waiting was correlated with delay-discounting, self-control, uncertainty avoidance, Openness, Conscientiousness, Agreeableness, and self-efficacy, whereas Controlling-Impulse was correlated with self-control, Conscientiousness, and Agreeableness. Moreover, Planning-and-Waiting was the unique predictor of CFC-Future, but Controlling-Impulse predicted substantive variance in both CFC-Future and CFC-Immediate. Study 3, using multi-wave and multi-source data, further showed that only Controlling-Impulse was an important predictor of long-term performance and creative performance, supporting the distinctiveness of the two factors.

Delay of gratification is a choice orientation in which individuals try to forego an immediate gratification to attain a more valuable outcome later on (Mischel, 1974). Many studies have documented the importance and implications of the ability to delay gratification in early childhood for lifelong development (see Ayduk, 2007, for review). As a kind of self-regulation, previous research even indicates that delay of gratification has a bigger effect on academic performance than IQ does, because delay of gratification may help students display more academic engagement behavior (Duckworth & Seligman, 2005).

Although delay of gratification is so important, its structure is still not clear. The experimental paradigm of delay of gratification adopted in most research merely measures the length of time a child can wait for a delayed, larger reward (Mischel, 1974); but does not measure the components of delay of gratification. Moreover, all delay of gratification questionnaires (e.g., GDGQ, Ray & Najman, 1986; ADGS, Bembunty, & Karabenick, 1998) consider delay of gratification to be unidimensional. Although Mischel (1974) proposed a two-phase model of delay of gratification—

¹Address correspondence to Prof. Lei Wang, Ph.D., Department of Psychology, Peking University, Beijing, China or e-mail (leiwang@pku.edu.cn). This work is supported by NSFC Grant #71021001.

In previous research, it has been found that students reporting greater delay of gratification were higher in self-efficacy (Bembenutty & Karabenick, 1998), and adults' self-efficacy was associated positively with their

employment arena is the production of novel and useful ideas by employees—idea that can be the starting points for innovation (Oldham & Cummings, 1996). Creativity in the current samples of high-tech company employees should be an indicator of performance, because when employees exhibit creativity at work they produce novel, potentially useful ideas about organizational products, practices, services, or procedures (Shalley & Zhou, 2008). Therefore, it was predicted that the relations between the two delay-of-gratification factors and creative performance would be similar to their relations with job performance.

In the current study, the possible two-factor structure of the GDGQ was first examined using exploratory factor analysis in Study 1. In Study 2, the GDGQ's two-factor structure was verified by confirmatory factor analyses and its validity was examined. In Study 3, the roles of the two delay-of-gratification factors in predicting job and creative performance were explored.

Study 1 explored the possible factor structure of GDGQ. For research purposes, adult samples were recruited from organizations and an Exploratory Factor Analysis (EFA) of the GDGQ's 12 items was conducted to obtain a preliminary view of the overall relational structure of these items.

METHOD

Participants were recruited from four information technology companies in China. A total of 322 applicants (190 men) were asked to complete the GDGQ voluntarily. The average age was 27.2 yr. ($SD = 4.0$). Among these participants, 98.4% had a college diploma or higher degree.

The 12-item Generalizability of Deferment of Gratification Questionnaire (GDGQ; Ray & Najman, 1986) was used to measure general delay of gratification. The respondents rated to what extent they agreed with each item on a 7-point scale with anchors 1: Strongly disagree and 7: Strongly agree.

The GDGQ was translated and back-translated using approved techniques (Bracken & Barona, 1991). Firstly, a researcher whose native language was Chinese translated the scales from English to Chinese. Then, a Chinese translator majoring in English who did not know the study's purpose completed the back-translation. Thirdly, another researcher compared the two English versions and checked whether each item's mean-

TABLE 1
 FINAL VERSION OF GENERALIZABILITY OF DEFERMENT OF GRATIFICATION QUESTIONNAIRE
 IN STUDY 1 (N = 322)

Scale Item	Component Loading		Communality
9. [I like to spend my money as soon as I get it.] (R)	.78	.02	.60
5.2 [I am constantly "broke."] (R)	.64	.18	.44
6. >			
[I agree with the philosophy: "Eat, drink and be merry, for tomorrow we may be all dead."] (R)	.60	.14	.38
4. >			
[When I am in a supermarket, I always tend to buy a lot of things I hadn't planned to buy.] (R)	.57	.10	.34
7. [I describe myself as often being too impulsive for my own good.] (R)	.55	.10	.36
3. >			
[I tended to save my pocket money as a child.]	.54	-.26	.32
1. >			
[I am good at saving my money rather than spending it straight away.]	.51	.25	.32
2. >			
[I enjoy a thing all the more because I have had to wait for it and plan for it.]	.05	.69	.48
12.			

higher degree. The GDGQ, delay-discounting rate scale, three Big Five subscales (Agreeableness, Conscientiousness, Openness), and a self-control scale were administered (see below).

All of the following questionnaires' items were rated on a 7-point scale with anchors 1: Strongly disagree and 7: Strongly agree, except for the

delay discounting rate scale. Since this study used translated scales, CFA was run on each scale to ensure that the factor structure was the same as that of the original scales. Internal consistency reliabilities were checked as Cronbach's α and McDonald's ω (see Table 2 for complete information).

(Dorfman & Howell, 1988).—The 7-item Uncertainty Avoidance Scale was used to measure the tendency to avoid uncertainty. Example items are as follows: "Standard operating procedures are helpful to employees on the job." A higher score indicates the respondent's stronger tendency to avoid uncertainty. Internal consistency reliability of the scale was acceptable. The one-factor structure fit the present data well: GFI = .98, AGFI = .96, CFI = .99, RMSEA = .051.

(CFC: Strathman, 1994).—The 12-item scale was used to estimate the extent to which people consider the potential distant outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes (Strathman, 1994). The CFC has two subscales labeled CFC-Future (e.g., "I consider how things might be in the future, and try to influence those things with my day to day behavior") and CFC-Immediate (e.g., "My behavior is only influenced by the immediate") (Petrocelli, 2003; Joireman, 2008). Higher scores on both the CFC-Total and CFC-Future scales reflect a higher concern with future consequences, whereas higher scores on the CFC-Immediate scale reflect a higher concern with immediate consequences. Internal consistency reliabilities of the scales were acceptable. The two-factor structure fit the present data acceptably: GFI = .94, AGFI = .88, CFI = .88, RMSEA = .082.

TABLE 2
DESCRIPTIVE STATISTICS AND PEARSON CORRELATIONS AMONG VARIABLES FOR SAMPLE 1 IN STUDY 2 (N = 322)

Variable	Correlations									
	1	2	3	4	5	6	7	8	9	10
1. Gender	1.60	0.49								
2. Age	28.14	6.78	.01							
3. PW	4.63	0.93	-.13	(.60/.62)						
4. CI	4.75	1.05	-.06	.16†	(.75/.70)					
5. Deferment of gratification	4.71	0.80	-.10	.11	.57†	(.73/.72)				
6. CFC-Total	4.32	0.73	-.17†	-.12	.23†	.26†	(.70/.78)			
7. CFC-Future	4.40	0.72	-.18†	-.05	.29†	.25†	.33†	.73†	(.72/.76)	
8. CFC-Immediate	4.26	0.94	.13	.13	-.14	.12				

according to a given formulation. δ is a parameter that reflects the extent to which future rewards are diminished in value as a function of the delay that must be endured to receive them. The distributions of δ s were approximately normalized using the natural log transformation, so the following calculations were based on $\ln \delta$ (see Kirby, 1999, for review). Higher δ and $\ln \delta$ indicate participants' stronger tendency to choose an immediate reward.

(Saucier, 1994).—

These three personality traits were measured using Saucier's (1994) Big Five mini-markers, which include 40 adjectives tapping the five factors Extraversion, Neuroticism, Agreeableness, Conscientiousness, and Openness. In the present study, internal consistency reliability and model fit were acceptable: Agreeableness's α was .67, (GFI = .97, AGFI = .92, CFI = .96, RMSEA = .064); Conscientiousness's α was .79, (GFI = .96, AGFI = .90, CFI = .96, RMSEA = .077); Openness's α was .73, (GFI = .97, AGFI = .94, CFI = .99, RMSEA = .027).

(SCS; Tangney, 2004).—The brief, 13-item version was used to estimate participants' self-control ability. Example items include "I am good at resisting temptation" and "I say inappropriate things" (reverse scored). Participants' higher scores on the scale reflect greater capacity to override their thoughts, feelings, and habitual patterns of behavior. In the present study, Cronbach's α was .75. The one-factor structure fit the present data acceptably: GFI = .90, AGFI = .85, CFI = .88, RMSEA = .064.

Except for the Chinese version of the Self-Efficacy Scale (Schwarzer, Bäßler, Kwiatek, Schroder, & Zhang, 2008), other scales used in Study 2 were translated and back-translated by the approach described in Study 1.

RESULTS

To assess the factor structure of the GDGQ, confirmatory factor analysis procedures were conducted using structural equation modeling in Sample 1 by using maximum likelihood estimation (Arbuckle & Wothke, 1999). Items were retained based on two indices: the modification index of each item ($MI > 4$) and the factor loading ($\lambda > .30$). The result verified the two-factor structure obtained in the EFA and had acceptable fit: GFI = .95, AGFI = .90, CFI = .89, RMSEA = .079 (Sample 1); GFI = .87, AGFI = .87, CFI = .87, RMSEA = .08 (Sample 2). Moreover, the chi-square test of differences indicated that the two-factor model provided a statistically significantly better fit than the one-factor model: Sample 1, $\chi^2 = 41.88$ ($p < .001$); Sample 2, $\chi^2 = 61.40$ ($p < .001$). All items loaded statistically significantly ($p < .001$) on the latent variable. Factor loadings ranged from .30 to .73. Thus, the results of the EFA and CFA supported the hypothesis that delay of gratification had a two-factor structure, Controlling-Impulse and Planning-and-Waiting.

Cronbach's α and McDonald's ω^2 were calculated for each scale (Table 2 and Table 3) (Zinbarg, Yovel, Revelle, & McDonald, 2006). Many scales are assumed to be primarily a measure of one latent variable. If that is true, the latent variable should account for the majority of the variance in the scale scores. Omega is calculated based on confirmatory factor analysis and is a more accurate estimate (McDonald, 1999; Zinbarg, Revelle, Yovel, & Li, 2005).

The internal consistency reliabilities of Controlling-Impulse and the overall scale were acceptable (Cronbach's $\alpha = .70$ to $.75$; McDonald's $\omega^2 = .70$ to $.78$; see Tables 2 and 3), while Planning-and-Waiting had relatively poorer internal consistency (Cronbach's $\alpha = .60$; McDonald's $\omega^2 = .62$ to $.64$). The two subscales were weakly related in both samples (Sample 1, $r = .19$; Sample 2, $r = .21$). Item-total correlations were low to moderate, ranging from $.28$ to $.63$ (Sample 1) and $.33$ to $.61$ (Sample 2).

Table 2 and Table 3 display the descriptive statistics and correlations among measures. Controlling-Impulse and Planning-and-Waiting 61 Jvd iw(Sampand I

TABLE 3
DESCRIPTIVE STATISTICS AND PEARSON CORRELATIONS FOR SAMPLE 2 IN STUDY 2 (N = 165)

Variable	Correlations									
	1	2	3	4	5	6	7	8	9	10
1. Age	27.07	3.57								
2. Gender	1.54	0.50	.08							
3. PW	4.75	0.97	.07	-.09	(.60/.64)					
4. CI	4.74	0.95	.12	-.06	.21†	(.70/.70)				
5. Deferment of gratification	4.71	0.75	.11	-.10	.62†	.88†	(.70/.71)			
6. Lnk	-4.00	1.48	.00	.10	-.20*	-.14	-.20*			
7. Agreeableness	5.65	0.70	.09	.05	.29†	.25†	.32†	.02	(.67/.75)	
8. Conscientiousness	5.08	0.86	.19	-.12	.37†	.31†	.42†	-.13	.49†	(.79/.79)
9. Openness	5.03	0.70	-.18	-.27	.34†	.14	.28†	-.15	.41†	.44† (.73/.73)
10. Self-control	4.74	0.81	.17	.02	.38†	.40†	.51†	-.11	.24†	.41† (.75/.88)

—Gender: men = 1; women = 2; CI = Controlling-Impulse; PW = Planning-and-Waiting; Lnk = Delay-Discounting Rate; Cronbach's alphas and McDonald's omegas (/) are on the diagonal in brackets. * < .05. † < .01.

.38, which was larger than the square of the correlation between the two factors (Sample 1, .16; Sample 2, .04), indicating that divergent validity is acceptable (Formell & Larcker, 1981).

In Study 3, the two-factor model's predictive validity was examined via correlation analysis and linear regression. It was hypothesized that these two factors would function differently in predicting employees' long-term achievement in organizations, such as performance and creative performance. In the first two studies, self-report data from the same source was used; here, to reduce common method bias, supervisors' ratings of performance and creative performance were elicited three months after the employees were administered the self-report measures.

METHOD

An independent sample, including 85 participants (49 men, 36 women) were recruited from four private and foreign Chinese information technology companies. The average age was 27.7 yr. ($SD = 3.2$), and 97.6% had a college diploma or higher degree. Participants were classified by job position: 63 were front-line employees (74.1%), 16 were mid-level managers (18.8%), four were senior managers (4.7%) and two did not report their job responsibilities (2.4%).

To reduce common method errors, data were collected in two waves. All employees were asked to complete the GDGQ and the three scales from the Big Five personality scale (Time 1). Three months later (Time 2), their supervisor-rated job performance and creative performance scores were collected.

Delay of Gratification.—The 11-item two-factor GDGQ established in Study 1 and 2 measures delay of gratification.

Superior-Rating Performance Scale.—Farh and Cheng's (1997) 4-item superior-rating performance scale was used as the measure of job performance. Superiors rated their subordinates (e.g., "He/she is one of the best employees in my department") on a 7-point Likert-type scale with anchors 1: Very strongly disagree and 7: Very strongly agree. The translated Chinese version had been used in the past (e.g., Aryee & Chen, 2006). In the present study, Cronbach's α was .89.

Creative Performance Scale.—Creative performance was assessed by George and Zhou's (2001) 13-item scale. Superiors rated their subordinates (e.g., "Suggests new ways to increase quality") on a 7-point Likert-type scale with anchors 1: Very strongly disagree and 7: Very strongly agree. The

translated Chinese version has been used in the past (e.g., Zhou, Shin, Brass, Choi, & Zhang, 2009; Wang & Cheng, 2010). In the present study, Cronbach's α was .89.

RESULTS

Table 4 displays descriptive statistics and correlations among measures. Job performance and creative performance were significantly and positively correlated to Controlling-Impulse and delay of gratification, but were not statistically significantly correlated to Planning-and-Waiting. Hierarchical regression analyses were conducted to assess the function of Controlling-Impulse and Planning-and-Waiting in predicting job performance and creative performance. Both the Controlling-Impulse and Planning-and-Waiting scores were mean-centered.

Predicting job performance ratings, Step 1 included control variables (age was deleted due to multicollinearity, $VIF > 10$) (Neter, Wasserman, & Kutner, 1990). Step 1 did not reach statistical significance ($F = .08, p > .05$), but job position was a statistically significant predictor of job performance ratings ($\beta = .36, p < .05$). In Step 2, performance was regressed on Controlling-Impulse and Planning-and-Waiting. This step produced statistically significant results ($F = .20, p < .01$; $\beta = .12, t_{2,79} = 8.3$).

TABLE 4
DESCRIPTIVE STATISTICS AND PEARSON'S CORRELATIONS IN STUDY 3 (N = 85)

Variable	Correlations							
	1	2	3	4	5	6	7	8
1. Age	27.73	3.23						
2. Gender	1.42	0.50						
3. Job position	1.26	0.58	.47†					
4. Job performance	4.70	0.85	.16	-.10				
5. Creative performance	4.30	0.73	.12	-.07	.23*			
6. PW	5.32	0.67	.12	-.03	.26*	.74†		
7. CI	4.19	0.90	.32†	-.32†	.19	.03	.07	
8. DG	4.75	0.54	-.35†	.16	-.03	.31†	.41†	
			-.09	.06	.09	.28†	.39†	.55†
						-.09	.78†	.70/.79
						.60/.65		

—Gender: men = 1; women = 2; CI = Controlling-Impulse; PW = Planning-and-Waiting; DG = Deferment of Gratification. Cronbach's alphas and McDonald's omegas (/) are on the diagonal in brackets. * < .05 † < .01.

Waiting did not. These results are consistent with recent arguments that

two-factor structure of delay of gratification. As for three of the Big Five personality traits, only the measure of Openness showed discriminative correlation with the two factors of delay of gratification. Previous research has supposed that participants with Openness can manage to delay gratification because they can avoid focusing on the possibility of an immediate reward (Krueger, 1996). However, the results of the present study refuted this view and clarified that participants with Openness could delay gratification by planning and waiting for a large, delayed reward rather than by controlling impulses on an immediate reward.

In addition, this study advances understanding of the functions of delay of gratification. Although Mischel (1974) proposed a two-phase model for delay of gratification, there is no research explaining which phase is more important in the process of delay of gratification. Compared with Planning-and-Waiting, Controlling-Impulse was a stronger predictor of supervisor's ratings of employees' performance and creative performance. Mischel's view of emphasizing the important role of Controlling-Impulse on task performance (Mischel, 1983) and the findings that impulsivity impairs performance in completing reasoning tasks (Schweizer, 2002), offer parallel explanations for this result. For objective reasons (e.g., chances of promotion) and subjective reasons (e.g., whether one's superior is favorable or not) in an organization, people with high delay of gratification are not guaranteed to get what they wait and plan for in their careers (Pogson, Cober, Doverspike, & Rogers, 2003). Therefore, just waiting and planning cannot itself lead to good job performance and creative performance.

The study has several limitations. Firstly, the subscale Planning-and-Waiting had poor internal consistency reliability (Cronbach's $\alpha = .60$); McDonald's α was also poor (.62 to .64). However, Planning-and-Waiting rather than Controlling-Impulse had statistically significant correlations with uncertainty avoidance, delay discounting rate, self-efficacy, and Openness. Therefore, Planning-and-Waiting is an indispensable factor of delay of gratification. It differentiates general delay of gratification from impulsivity. The low reliability may be due to the small number of items, so future research could add new items to increase the scale's internal consistency.

- CALDWELL, L. M., & MOWRER, R. R. (1998) The link between procrastination, delay of gratification, and life satisfaction: a preliminary analysis. *Journal of Personality and Social Psychology*, 74, 3, 145-150.
- DECOSTER, J. (1998) *Statistical Concepts and Methods*. University of Alabama, Department of Psychology Retrieved from: <http://www.stat-help.com/notes.html>.
- DORFMAN, P., & HOWELL, J. (1988) Dimensions of national culture and effective leadership patterns: Hofstede revisited. *Journal of Personality and Social Psychology*, 54, 3, 127-150.
- DUCKWORTH

McDONALD, R. P. (1999)

f

. Hillsdale, NJ: Erlbaum.

M

