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THE EFFECTS OF PERCEIVED SUPPORT FOR CREATIVITY ON INDIVIDUAL CREATIVITY OF DESIGN-MAJORED STUDENTS: A MULTIPLE-MEDIATION MODEL OF SAVORING

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Abstract. *STEAM (Science, Technology, Engineer and Mathematics + Art/Design) education is presented to broaden interest in STEM fields, enhance the creativity of STEM students, and spur innovation. Although studies have explored the environment factors that influence individual creativity, few researches have investigated the role of students' savoring which might drive the demand-pull innovation in creativity cultivation. Therefore, this study aims to explore the effects of perceived support for creativity and the multiple mediation of savoring capacity on individual creativity in the context of undergraduate Design education. The instruments were administered to 851 Design-majored students in Taiwan. The collected data were tested against the research model using a path analysis-based procedure of multiple-mediators analysis. Research findings include: (1) Both students' perceived support for creativity and their ability to savor (through anticipation, enjoying the moment, and reminiscence) have significant positive effects on their individual creativity; (2) Among the three methods of savoring, savoring the moment alone has significant positive effects on individual creativity; (3) Students' perceived support for creativity mediated by their ability to savor the moment has significant positive effects on their individual creativity. The findings provide several important theoretical and practical implications regarding fostering students' creativity in the context of STEAM education.*

Key words: *STEAM education, perceived support for creativity, individual creativity, savoring, multiple mediation.*

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Introduction

Creativity and innovation are two powerful driving forces behind the global competitive in the 21st century. In such fiercely competitive arena, individuals need to be innovative in order to adapt and adequately respond to the ever-changing market environment. This kind of innovative response is largely dependent on the creative performance of the individual. Therefore, the cultivation of creative mindset and creativity has been regarded as the essential criterion for those aiming to lead, to succeed, or even to just survive (Gehani, 2011; Jung, Chow, & Wu, 2003). Barak (2010) revealed that creativity is the key to find new and efficient solutions to problems or the invention of new products and services, but creativity cultivation in traditional engineering and technology education of STEM field does not attract the educators' attention. Because creativity is regarded as spiritual process that cannot be thought or improved and creativity, human ability, is recognized as less serious or important in comparison to the exact sciences like mathematics or physics (Barak, 2010, p. 391). The present-day universal corporate demands for creative talents further underscore the necessity and urgency for education to focus on nurturing and cultivating creativity.

STEM (Science, Technology, Engineering, and Mathematics) education has been implemented to increase competitiveness in science and technology development of global economy. Recently, STEAM (STEM + Art/Design) education is presented to enhance the creativity of STEM students and broaden interest in STEM fields. Sochacka, Guyotte and Walther (2016, p.16) proposed four foremost arguments for adding the arts to STEM education: (1) *Arts education is a key to creativity,* (2) *Creativity is an essential component of, and spurs innovation,* (3) *Innovation is agreed to be necessary to create new industries in the future, and* (4) *New industries, with their jobs, are the basis for our future economic well-being*. Broks (2014) pointed that Science and

Technology Education (STE) along with Artistic and Pragmatic Education today is continuously and fast developing branch of education to satisfy actual needs of modern life. It follows the development of scientific research of real life phenomena and implementation of corresponding results in practice. Peppler (2013) had proposed a STEAM project to resonate with girls as well as boys for e-textile practices and products. This project engaged novice designers in nonengineering practices to cultivate interest in the activity and building a bridge between the arts and STEM. However, compared with US, STEM education in Taiwan is at the early stage (Tseng, Chang, Lou & Chen, 2013). Ministry of Education of Taiwan empowered universities to develop STEM programs which students can access STEM education through short-term interdisciplinary courses to reinforce students' competitiveness. Responding to the STEAM trend, Taiwan government has implemented curriculum reforms with an emphasis on creativity development in a top-down mode to transform the Republic of China into the Republic of Creativity by providing students with organized and interdisciplinary activities to gain practical experience especially in higher education (Lin, 2011). Because creativity can be developed through training in creative problem solving to find the best solution quickly (Lin, 2011). Schilling (2012) indicated that there are two sources of innovation: science-push innovation and demand-pull innovation. From the perspective of science-push innovation, the products are developed via the process of "science discover - innovation - manufacturing - marketing"; the product develop process for demand-pull innovation is customer driven, "customer suggestions - innovation - manufacturing". However, university STEM programs in Taiwan, which emphasized the demand-pull innovation from engineering or production viewpoints instead of from the perspective of customers' needs should be an issue.

Prior studies have investigated individual's creative behaviors on various theoretical perspectives. Amabile and Pillemer (2012) suggested researches on creativity should be conducted from the perspective of social psychology, with particular emphasis on the overall development of an individual's creative behaviors within social context. It has been observed that individual creativity is not only affected by the individual's personality and intelligence, but also by his or her perceived social support and opportunities in the work domain; the interaction between the individual, other persons and work therefore bears particular significance (Gardner, 1993). Although prior studies have explored the environment factors that influence individual creativity, few studies have investigated the role of student's savoring, that prolongs and heightens an individual's experience of positive emotion, in creativity cultivation (Chang, Wang & Lee, 2015). The concept of savoring was emerged from positive psychology (Seligman, 2002). Bryant and Veroff (2007) defined savoring as the ability to appreciate and enjoy positive experiences, to notice and become aware of the positive events in life, and to focus one's attention and maintain mindfulness on them consciously. More important, many studies have shown that savoring prolongs and heightens an individual's experience of positive emotion (Bryant, 1989, 2003; Seligman, Rashid, & Park, 2006) and that positive emotion affects individual creativity (Bryant & Veroff, 2007; George & Zhou, 2007). Chen and Chuang (2008) implied designers' savoring processes can drive the demand-pull innovation by converting their experience and emotional feeling into rational judgment to design an impressive product on the basis for customer need, future economic and/or environmental well-being. This study, therefore aims to examine the relationships between social support for creativity, savoring, and individual creativity of students from Design departments of Taiwan for STEAM education.

Environmental factors mediated by personal factors can potentially affect individual outcome variables – a point frequently overlooked in earlier studies (Amabile, 1996). Being in a constructive environment where members are mutually supportive has the effect of arousing stronger positive emotion of an individual that in turn inspires the generation of creative ideas and stimulates creativity (Amabile et al., 2005). When Amabile (1996) incorporated social contextual factors into her componential theory of creativity, she maintained that a supportive social environment directly impacts an individual's intrinsic motivation to be creative, and that the environment integrates other extrinsic motivators to jointly influence the creative process of an individual (Amabile, 1996). Other researchers have recommended state affect and trait affect be considered as factors in the componential theory of creativity on top of the preexisting social contextual ones, because affect and creative thinking are similar and relative psychological processes (Amabile, Barsade, Mueller, & Staw, 2005). Fredrickson's broaden-and-build theory of positive emotions further postulated that joy, love, and other types of positive emotion broaden the scopes of one's attention, cognition and action, and thereby awaken one's talents on all levels (cognitive and behavioral) (Fredrickson, 1998, 2001). Broadening the scopes of these psychological activities means increasing creative elements and enhancing creativity (Amabile et al., 2005). The study of Lyubomirsky, King and Diener (2005) have found that people who are chronically happy received higher scores on measures of creativity than those who are not; therefore, supporting the claim that positive affects enhance creativity.

Savoring is associated with but different from happiness and pleasure (Camgoz, 2014). It refers to the active

process of enjoyment that involves "a higher order awareness or reflective discernment on the part of the individual" (Bryant & Veroff, 2007). Up until now, studies on savoring have mostly probed into the quality and/or quantity of affects (Bryant, 2003; Chen, 2013; Hurley & Kwon, 2012, 2013; Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Recently, researchers have suggested such studies move in the direction of "developing viable methods of measuring and analyzing the mediational mechanisms involved in real-time savoring" (Bryant, Chadwick & Kluwe, 2011). Mediation is an important methodological concept in social science research (Wen & Chiou, 2009), aiming to investigate the probable causation of mediator variable(s) on the basis of a pre-established causal relationship between known independent (X) and dependent (Y) variables. Its significance and value in research lie in its potential to explain the mechanism functioning behind causal relationships and to integrate existing theories and research findings. Mediation studies have currently progressed to covering the domain of multiple mediations. Despite the large and strong demands for such multiple-mediation models in applied sciences, their methods of assessment have received little attention in literature thus far (Preacher & Hayes, 2008). On that account, this study intends to apply a multiple-mediation model on savoring in order to simultaneously examine the mediation effects of anticipatory savoring, in-the-moment savoring, and reminiscent savoring between perceived support for creativity and individual creativity. Hopefully, this model will bring research on the psychological mechanisms of creative processes one step further and will contribute to the theoretical development in the fields of educational psychology, sociology, and management.

Theoretical Framework and Hypotheses Development

The Effect of Students' Perceived Support for Creativity on Their Individual Creativity

Amabile (1983) stated in her componential theory of creativity that "creativity is best conceptualized… as a behavior resulting from particular constellations of personal characteristics, cognitive ability, and social environment". From the perspective of college students, this social/organizational environment would be the college or university they attend. On campus, students' support for creativity comes from a creative school climate (i.e., a school culture supportive of creativity), supportive/encouraging professors, and helpful classmates (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Oldham & Cummings, 1996).

It is noted that individuals' creative behaviors and their perceived organizational support for creativity are highly correlated (Scott & Bruce, 1994). Creative school climate has been found to have significant and direct positive effects on teachers' creative teaching performance (Hsiao, 2011, 2015). Several studies on the leadership behaviors of business executives have shown that supervisory support and feedback have a positive effect on employee creative performance, prompting employees to work harder to be creative (Amabile, Schatzel, Moneta, & Kramer, 2004; Shalley & Gilson, 2004). Team context, on the other hand, can also facilitate individual creativity through fostering and encouraging individual learning (Hirst, van Knippenberg, & Zhou, 2009). The direct relationship between group/team creativity and individual creativity has been confirmed (Akinlade, 2014). Teachers' team learning behaviors positively affect their creative teaching performances (Chen & Kuo, 2013). In contrast, an unsupportive organizational climate has a negative effect on the individual creativity of its members (Choi, Anderson, & Veillette, 2009). Based on the aforementioned literature review, the following hypotheses were proposed:

H1: Students' perceived support for creativity has a positive effect on their individual creativity. ($X \rightarrow Y$, c)

The Effect of Students' Perceived Support for Creativity on Their Savoring Capacity

Creativity is not merely a personal phenomenon, it is greatly affected by the social and/or work environment of the person as well; the individual's perceptions of organizational encouragement, resource sufficiency, and management practices jointly influence the effect of their task motivation on their individual creativity (Amabile, 1997). Social support can be considered from two distinctive aspects – work-related (from supervisor and coworkers) and non-work-related (from spouse, friends, family, and relatives) (Carlson & Perrewe, 1999). In this study, the work environment for the students is the university; and the sources of their perceived support for creativity include the school climate, encouragement/help from professors, and encouragement/help from classmates. Social support is considered the greatest way for an individual to cope with stress and misfortune in the majority of adverse situations; social network provides the means for the individual to share their thoughts and feelings with people who

are important to them (Bloom, 1990; House, 1981; Lazarus & Folkman, 1984). This kind of sharing has the effect of elevating the positive emotion of the sharer (Gable, Reis, Impett, & Asher, 2004; Langston, 1994).

Savoring is a facet of positive psychology that demonstrates an individual's ability to regulate positive affects (Nelson & Simmons, 2003; Simmons, 2002). Bryant and Veroff (2007) proposed six cognitive-behavioral constructs that augment a person's ability to savor positive experiences: (1) social support; (2) writing about life experiences; (3) downward hedonic contrast; (4) humor; (5) spirituality and religion; and (6) awareness of the fleetingness of experience. These six constructs are valuable tools for managing affects in that they not only help people cope with negative experiences, but also savor positive ones. As can be seen, social support is listed as number one among them. The empirical study of Chang (2014) has confirmed that teachers' interactions with each other in their professional learning communities could indeed effectively predict their ability to savor. Based on these claims, this study hypothesized as follows:

H2-1: Students' perceived support for creativity has a positive effect on their ability to savor through anticipation. (X→M1, a1)
H2-2: Students' perceived support for creativity has a positive effect on their ability to savor the moment. (X→M2, a2)
H2-3: Students' perceived support for creativity has a positive effect on their ability to savor through reminiscence. (X→M3, a3)

The Mediation of Savoring

Savoring is a form of an individual's perceived control over their positive emotion that is different among individuals (Bryant, 1989). It is one's ability to enjoy and become absorbed in positive experiences that involves self-regulation of positive emotions (Bryant, 1989, 2003). In 2003, Bryant introduced three constructs of savoring: (1) savoring through anticipation - the ability to pleasure by looking forward to upcoming positive events; (2) savoring the moment – the ability to utilize cognitive or behavioral strategies to magnify and extend the enjoyment in the present; (3) savoring through reminiscing – the ability to increase the sense of well-being or happiness by remembering positive events in the past (Bryant, 2003). These are the most typical forms of savoring through which people can generate, intensify, or prolong positive feelings/emotions (Bryant & Veroff, 2007; Bryant, Ericksen & DeHoek, 2008). Studies have proven that savoring indeed prolongs and intensifies an individual's experience of positive emotion (Bryant, 1989, 2003; Seligman et al., 2006) and enhances their individual creativity (Bryant & Veroff, 2007). Employees with better savoring capacity were found to have greater creativity (Chiu, 2009) and exhibit more innovative behaviors (Chiu, 2009; Chen, 2011; Lee & Jeng, 2014). In light of the above findings, the following hypotheses were proposed:

H3-1: Students' ability to savor through anticipation has a positive effect on their individual creativity. (M1→Y, b1)
H3-2: Students' ability to savor the moment has a positive effect on their individual creativity. (M2→Y, b2)
H3-3: Students' ability to savor through reminiscence has a positive effect on their individual creativity. (M3→Y, b3)

It is also possible for people to enjoy positive events better with social supports from friends, relatives, and et cetera (Bryant & Veroff, 2007). When one shares his/her positive experience with others, he/she experiences "greater positive affect and satisfaction with life, above and beyond the importance of the event itself" (Gable et al., 2004). Amabile and colleagues have taken support for creativity itself as a factor contributing to creativity, and assessed people's perceptions of work environment for creativity from the aspects of organizational encouragement, supervisory encouragement, and work group supports (Amabile et al., 1996). The results of their research indicated that employees produce more creative projects when they perceive support from their supervisors (Amabile et al., 1996). Employee creative performances are found to be significantly improved by the creative-idea input, provision of resources, and positive feedbacks from supervisors (Mumford, Scott, Gaddis & Strange, 2002). Tierney and Farmer's study of the Pygmalion model revealed that when supervisors demonstrate higher creativity expectations for their employees and provide them with feedbacks, the employees would correspondingly perform better on creative tasks (Tierney & Farmer, 2004). In addition, several studies on the mediation of savoring conducted in

Taiwan supported the views connecting savoring to positive effects and creativity: employees' organizational attachment positively affects their sense of well-being via the mediation of their savoring capacity (Tsai, 2014); the effect of college students' personality on their creative self-efficacy is partially mediated by their ability to savor (Lin, 2013); and employees' perceived psychological empowerment enhances their innovative behaviors via the mediation of their savoring capacity (Chen, 2011). Inferring from the aforementioned views and findings, this study thus proposed the following hypothesis:

H4: Students' perceived support for creativity indirectly affects their individual creativity via the mediation of their ability to savor (through anticipation, the moment, and through reminiscence) (X, M1, M2, M3→Y, c')

Methodology of Research

In this study, an empirical research was conducted to examine the relationships between social support for creativity, savoring, and individual creativity in the educational environment. Sample, research framework, research method, variables and measures are explained respectively in the following subsections.

Samples

The population included fourth-year design-majored students (Industrial and Commercial Design, Industrial Design, Commercial Design, Architecture and Interior Design, Digital Multimedia and Animation Design, Fashion Design etc.) from several universities of science and technology in Taiwan. Two sets of samples were collected. The first sample, comprised of 180 students from three universities, was collected by convenience sampling method to analyze the reliability and validity of the measures. The second was done through stratified purposive sampling: selecting students from 13 selected universities from the northern, middle, and southern regions of Taiwan to participate. The resulting 851 valid samples were used to perform confirmatory factor analyses (CFA) on the measures and to test the hypotheses. The samples consisted of 66% females and 34% males; 88% private-university and 12% public-university students; 45% southern, 28% northern, and 26% central Taiwan residents, which is similar to the distribution of the population (as shown in Table1).

Table 1. The distribution of population and sample.

Area	Population		Sample					
	amount	%	Pre-test			Formal		
			distribution	valid	%	distribution	valid	%
North	1849	29	50	45	25	290	237	27.85
Center	2057	32	60	51	28.33	320	227	26.67
South	2535	39	90	84	46.67	390	387	45.48
Total	6441	100	200	180	100	1000	851	100

Research Framework and Method

This study adopted the multiple-mediator model (Preacher and Hayes, 2008) as the theoretical framework (see Figure 1) to examine the relationships between social support for creativity, savoring, and individual creativity in the educational environment. Such model of multiple mediations examines the efficacy of testing between the individual and total mediated effects. In order to ascertain the mediatory effects of the three modes of savoring,

this study applied the indirect effect contrast in the multiple-mediator model to determine whether the difference between the effects of their mediation was significant.

Furthermore, this study utilized the statistical software, AMOS 22.0 and SPSS 20.0 for data analyses. The convergent validity of measures and the goodness-of-fit were examined with confirmatory factor analyses (CFA). Furthermore, this study utilized Andrew Hayes' PROCESS macro Model 4 (Hayes, 2013) to perform a path analysis-based multiple mediation analysis, which could simultaneously examine all paths proposed in the theoretical model and to avoid type I error and the problems of statistical power. Sobel test and bootstrapping were subsequently performed to obtain the confidence interval (CI) to see whether it included 0: if it did, the indirect effect would be deemed insignificant; if it did not, the effect would be considered significant.

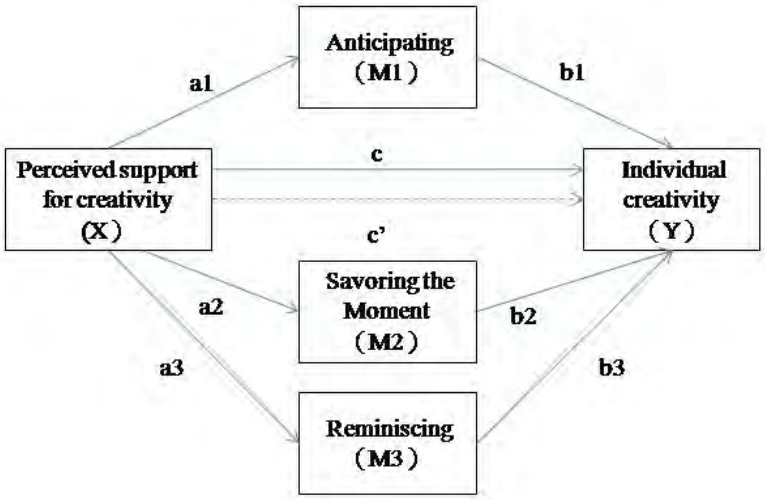

Figure 1: Conceptual model.

Illustration of a multiple-mediation design with 3 mediators. (1) X affects Y. (2) X is hypothesized to have indirect effects on Y via the mediations of M1, M2, and M3; a1 to a3, b1 to b3, c and c' = regression coefficients.

Variables and Measures

All measures adopted in this study have been published in international journals. The reliability and validity of these measures, which were tested and confirmed repeatedly under various experimental conditions on diverse participants, were described separately in the following subsections. In the process of compiling and editing the items used in the survey questionnaires, and in translating them into Chinese, experts and scholars were consulted for suggestions and revisions; the expert validity of measures was therefore also ensured.

Perceived support for creativity

The "encouragement of creativity" section of KEYS: Assessing the Climate for Creativity developed by Amabile and colleagues (1996) was abridged and used as the instrument to assess students' perceived support for creativity (PSC). After eliminating the items with low factor loadings (<.03), the remaining twenty-four 4-point Likert scale items were modified slightly to gauge school, professor and work-group supports instead of the original organizational, supervisory and work-group support; the higher the score, the greater the perceived support for creativity. Some of the sample questions are as follows: "People are encouraged to solve problems creatively in this school"; "My professor communicates well with our work group"; and "There is a feeling of trust among the people I work with most closely". In evaluating reliability and validity, the results of CFA showed that the *t*-value of all items on the measure were at the .001 level of significance; factor loadings were between .513 ~ .835; composite reliability (CR) was .950; and average variance extracted (AVE) was .447. The fact that factor loadings reached the cutoff value of .450 (Bentler & Wu, 1993), CR was higher than .700 (Hair, Black, Babin, & Anderson, 2009); and although the AVE

of perceived support for creativity did not reach the recommended cutoff value of .500, AVE typically has the tendency to be more conservative than CR (Fornell & Lacker, 1981); all demonstrated adequate internal consistency and convergent validity of the measure. In terms of model fit, RMSEA = .060, it was ≤ .060 and thus reflected a good fit (Hu & Bentler, 1999); NFI = .926, CFI = .943, both were higher than the .900 cutoff value and thus indicating an adequate fit (Hu & Bentler, 1998, 1999); GFI = .898, AGFI = .877, even though they failed to reach .900, but were nevertheless higher than .800, and thus still fell within the acceptable range (Hu & Bentler, 1999). These results demonstrated that the measure achieved a satisfactory model fit.

Savoring

This study adopted Bryant's Savoring Belief Inventory (SBI) (Bryant, 2003) to evaluate the ability to savor with twelve 7-point Likert scale items. The scale assesses savoring capacity from the perspectives of savoring through anticipation (ANT), savoring the moment (MOM), and savoring through reminiscence (REM). Higher score means higher savoring capacity. A few sample questions are as follows: "Before a good thing happens, I look forward to it in ways that give me pleasure in the present." (ANT); "I know how to make the most of a good time." (MOM); "I enjoy looking back on happy times from my past" (REM). In evaluating reliability and validity, the results of the CFA showed that the t-value of all items on the measure were at the .001 level of significance; factor loadings of the three constructs were between .814~.920; CRs were .905~.951; and AVEs were .705~.823. The fact that factor loadings reached the cutoff value of .450 (Bentler & Wu, 1993), CRs were higher than .700, and AVEs were higher than the .500 cutoff value (Hair et al., 2009) confirmed the convergent validity of the measure. In terms of model fit, RMSEA=.057, it was ≤ .060 and thus reflected a good fit (Hu & Bentler, 1999); GFI = .967, AGFI=.944, NFI=.978, CFI=.983, all were higher than the .950 cutoff value (Hu & Bentler, 1998, 1999). These results demonstrated that the measure achieved a good model fit.

Individual creativity

A 9-item 6-point Likert individual creativity scale developed by Tierney, Farmer and Graen (1999) was used to evaluate the individual creativity of students (IC); the higher the score, the better the individual creativity. Some sample questions are "I demonstrated originality in my work", and "I took risks in terms of producing new ideas in doing my job". In assessing reliability and validity, the results of the CFA showed that the t-value of all items on the measure were at the .001 level of significance; factor loadings were between .777~.841; CR was .945, AVE was .656. The fact that factor loadings reached the cutoff value of .450 (Bentler & Wu, 1993), CR was higher than .700, and AVE was higher than the .500 cutoff value (Hair et al., 2009) confirmed the convergent validity of the measure. In terms of model fit, RMSEA = .059, it was ≤ .060 and thus reflected a good fit (Hu & Bentler, 1999); GFI = .978, AGFI = .953, NFI = .984, and CFI = .988, all were higher than the .950 cutoff value (Hu & Bentler, 1998, 1999). These results demonstrated that the measure achieved a good model fit.

Discriminant validity between Measures

To ensure that every dimension (perceived support for creativity, savoring and individual creativity) of the measures could be effectively distinguished, the discriminant validity between measures was assessed using the technique proposed by Fornell and Larcker (1981). This would mean that the AVE of each variable need to be greater than the square value of the correlation coefficient between them. As shown in Table 2, all AVE values are indeed greater than the square value of the correlation coefficient between variables, and thereby confirming the adequate discriminant validity between measures.

Table 2. Analysis of discriminant validity.

Variables	X	M1	M2	M3	Y
PSC (X)	.447				
ANT (M1)	.065	.800			

Variables	X	M1	M2	M3	Y
MOM (M2)	.100	.315	.705		
REM (M3)	.065	.366	.244	B	
IC (Y)	.118	.073	.188	.062	.656

Note. n = 851. The boldface, diagonally shown values are the AVEs. The italicized numbers are the square value of the correlation coefficient (r^2). PSC = perceived support for creativity; ANT = savoring through anticipation; MOM= savoring the moment; REM = savoring through reminiscence; IC = individual creativity.

Results of Research

There are two parts in research results to demonstrate the relationships between social support for creativity, savoring, and individual creativity in the educational environment. Descriptive statistical analysis depicts the means, standard deviations, alpha coefficients, and correlations among the variables. The second part describes how the three modes of savoring mediate the independent variable (X), perceived support for creativity (PSC) and the dependent variable (Y), individual creativity.

Descriptive Statistical Analysis

Pearson's correlation coefficient was used to examine the strength of the linear relationships between variables, i.e., the mean, standard deviation, and correlation coefficient between them (see Table 3). The results of the analysis revealed significant positive correlations between variables, among which, the correlation between ANT and REM was the highest ($r = .605$, $p < .01$). Correlations between ANT and MOM ($r = .561$, $p < .01$), MOM and REM ($r = .494$, $p < .01$), and MOM and individual creativity ($r = .434$, $p < .01$) were all considered moderate positive correlations. The only weak positive correlation was between REM and individual creativity ($r = .248$, $p < .01$).

Table 3. Means, standard deviations, alpha coefficients, and correlations.

Variables	M	SD	scale	X	M1	M2	M3	Y
PSC (X)	2.986	.527	1-4	.945				
ANT (M1)	5.548	1.116	1-7	.254**	.916			
MOM (M2)	5.064	1.054	1-7	.316**	.561**	.858		
REN (M3)	5.549	1.261	1-7	.255**	.605**	.494**	.930	
IC (Y)	4.076	.893	1-6	.343**	.270**	.434**	.248**	.934

*Note. n = 851. ** p < .01 (2-tailed). The boldface, diagonally shown values are the Cronbach a coefficients. SD = standard deviation; PSC = perceived support for creativity; ANT = savoring through anticipation; MOM = savoring the moment; REM = savoring through reminiscence; IC = individual creativity.*

Hypothesis Testing For the Multiple-Mediation Model

In testing the multiple mediations of the three modes of savoring in H4, perceived support for creativity (PSC) was the independent variable (X), individual creativity the dependent variable (Y), and the three modes of savoring – ANT (M1), MOM (M2), and REM (M3) were mediator variables. The effects of mediation were examined following the procedure suggested by Baron and Kenny (1986): (1) the independent variable must significantly predict the dependent variable (X→Y, c); (2) the independent variable must significantly predict the mediator variable (X→M, a); (3) the mediator variable must significantly predict the dependent variable (M→Y, b); and (4) the effect of the independent variable on the dependent variable must become insignificant (full mediation) or less (partial mediation) after mediation (X, M→Y, c'). Data were analyzed using Hayes' PROCESS macro Models 4 for hypothesis testing.

The path coefficients of multiple mediations are displayed in Table 4. Model 1 shows that PSC (X) significantly and positively predicted individual creativity (Y) ($c = .582$, $p < .001$; $R^2 = .118$, $p < .001$), indicating that H1 is sup-

ported. Model 2 shows that PSC (X) significantly and positively predicted ANT (M1) (a1 = .537, $p < .001$; $R^2 = .064$, $p < .001$), MOM (M2) (a2 = .632, $p < .001$; $R^2 = .100$, $p < .001$) and REM (M3) (a3 = .611, $p < .001$; $R^2 = .065$, $p < .001$); indicating that H2-1, H2-2 and H2-3 are all supported. Model 3 shows that ANT (M1) and REM (3) failed to significantly predict individual creativity and MOM (M2) was the only form of savoring that significantly and positively predicted individual creativity (b2 = .298, $p < .001$; $R^2 = .236$, $p < .001$); indicating that only H3-2 is supported, H3-1 and H3-3 are not. Although the regression coefficient of PSC (X) on individual creativity (Y) decreased after the mediation of MOM (M2), it still reached the level of significance (c' = .385, $p < .001$; $R^2 = .236$, $p < .001$); the partial mediation therefore supports the proposition made in H4. Quantification of mediation was done using the difference-in-coefficients method developed by Judd and Kenny (1981), $B_{indirect} = .296$ (a × b = c - c'). The indirect effect in H4 was tested with Sobel, results showed that the *Z*-value of MOM (M2) was 6.674 ($p < .001$); and the bootstrap 95% confidence intervals [0.224, 0.460] did not include 0, the indirect effect was therefore proven significant. The strength of indirect effect was at 32.38%, total effect at 33.82%. Based on these results, H4 is supported.

Difference tests were performed on the multiple mediation effects of the three modes of savoring. The results, as reflected in the individual creativity/dependent variable, show that the indirect effect of MOM was significantly higher than the indirect effects of the other two; the difference between the indirect effects of ANT ($Z = .204$, $p > .001$) and REM ($Z = .279$, $p > .001$) was insignificant. This goes to show that MOM is the only form of savoring among the three that significantly mediates the effect of PSC on individual creativity, and that its role as an affective factor is clearly distinct from the other two. Figure 2 depicts the estimated results of the multiple-mediation model of savoring.

Table 4. Regression coefficients for the multiple-mediation model of savoring.

	Individual creativity (Y)			Savoring (M)		
Variable	Model 1	Model 3		Model 2		
			M1	M2	M3	
Constant	2.339 ***	1.337 ***	3.945 ***	3.177 ***	3.725 ***	
PSC (X)	.582 ***	.385 ***	.537 ***	.632 ***	.611 ***	
ANT (M1)		.007				
MOM (M2)		.298 ***				
REN (M3)		.008				
R^2	.118 ***	.236 ***	.064 ***	.100 ***	.065 ***	
Quantifying indirect effects			a1 = .537	a2 = .632	a3 = .611	
c = .582			b1 = .007	b2= .298	b3 = .008	
c' = .385			a1×b1 = .004	a2×b2= .188	a3×b3 = .005	
c-c' = .197			Σa×b = .197			
Test of indirect effects						
Sobel test (Z)			.204	6.674 ***	.279	
Bootstrap 95% (CI)			[-.067, .078]	[.224, .460] [a]	[-.056, .068]	
Strength of mediation S_M (%)			.62%	32.38%	.82%	
Difference test – Bootstrap 95% (CI)	M2>M1 [.104, .277][a]					
	M3>M1 [.065, -.066]					
	M2>M3 [.115, .265] [a]					

*Note. n = 851. ** p < .01, *** p < .001. Unstandardized regression coefficients are reported. Bootstrap sample size = 10,000. [a] Zero is not contained between confidence intervals. PSC = perceived support for creativity; ANT = savoring through anticipation; MOM = savoring the moment; REM =savoring through reminiscence; CI = confidence interval.*

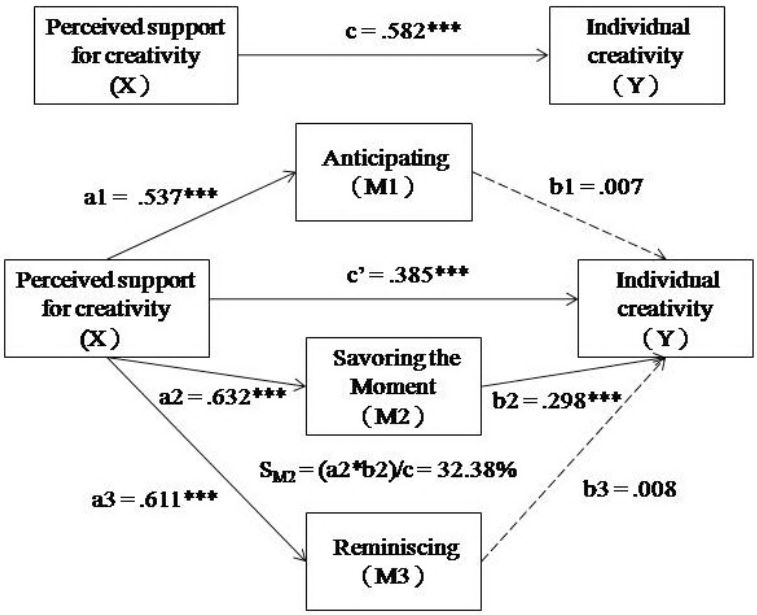

Figure 2: Multiple-mediation model of savoring.

The model is presented with unstandardized regression coefficients. Total and direct effects of independent variable on dependent variable are provided by the coefficient, $p < .001$.

Discussion

This study applied a multiple-mediation model on savoring to simultaneously examine the mediation effects of anticipatory savoring, in-the-moment savoring, and reminiscent savoring between perceived support for creativity and individual creativity. Moreover, hopefully this model could bring one further step research on the psychological mechanisms of creative processes as well as contribute to the theoretical development in the fields of educational psychology, sociology, and management. The discussion based on results were presented as the follows.

Perceived support for creativity has a direct positive effect on individual creativity

The data analysis showed that students' perceived support for creativity has a significant and direct positive effect on their individual creativity. This finding is similar to earlier studies (Akinlade, 2014; Amabile et al., 2004; Hirst et al., 2009; Shalley & Gilson, 2004; Chen & Kuo, 2013; Hsiao, 2011, 2015), and is in accordance with the assertion Amabile (1996) made in her componential theory of creativity that a supportive social environment has a direct influence over the generation of an individual's creativity.

Perceived support for creativity has a direct positive effect on each of the three modes of savoring

The data analysis showed that students' perceived support for creativity has significant and direct positive effects on savoring through anticipation, savoring the moment, and savoring through reminiscence, respectively. This finding is identical to the results of Chang's study (Chang, 2013), and it concurs with Bryant and Veroff's (2007) contention of the six cognitive-behavioral constructs (social support, writing about life experiences, etc.) being conducive to the enhancement of an individual's ability to savor positive experiences. The results of the study demonstrated that being in a creative school climate, having positive interactions with professors and classmates, and sharing positive experiences with others augment the savoring capacity of college students during creative performance.

Perceived support for creativity has a positive effect on individual creativity when mediated by in-the-moment savoring

The data analysis showed that among the three forms of savoring, savoring the moment alone has a significant positive effect on individual creativity. This finding corresponds to the results of previous studies (Chen, 2011; Chiu, 2009; Lee & Jeng, 2014), and is in agreement with Bryant and Veroff's claim of savoring being promotive of enhancing individual creativity (Bryant & Veroff, 2007). According to this study, savoring the moment was the only mode of savoring among the three to have a positive indirect effect (partial mediation) between perceived support for creativity and individual creativity. This finding is also similar to prior studies (Chen, 2011; Lin, 2013; Tsai, 2014), and is consistent with Amabile's assertion of environmental factors affecting individual outcome variables via the mediation of individual factors (Amabile, 1996). It further confirms the finding of Amabile and colleagues' 2005 study that a socially supportive and constructive environment can arouse in an individual stronger positive emotions that in turn will inspire the generation of his/her creative ideas and spark individual creativity (Amabile et al., 2005).

Additionally, the results of this study illustrate the possibility of positive emotion being able to broaden the scopes of a person's thoughts and actions as proposed by Fredrickson (2001) in her broaden-and-build theory. The fact that savoring prolongs and enhances one's experience of positive emotion (Bryant, 1989, 2003; Seligman et al., 2006) shows that it is possible for one to expand or extend their enjoyment of positive events through the utilization of cognitive or behavioral strategies (Bryant & Veroff, 2007). As to why savoring the moment is the only mode of savoring that affects individual creativity, it is as Snyder and Lopez (2007) said, that while savoring can be applied to one's enjoyment of past and future positive events, the enjoyment one experiences in the present moment is the surest and most stable form of savoring. Savoring is regarded as the ability, to appreciate and enjoy positive experiences, to notice and become aware of the positive events in life, and to focus one's attention and maintain mindfulness on them consciously. Designers' savoring processes can drive the demand-pull innovation by converting their life experience and emotional feeling into rational judgment to design an impressive product on the basis for customer need, future economic and/or environmental well-being. This underscores the importance and particularity of savoring in cultivating creativity.

Conclusions

This study, based on positive psychology, social psychology and Amabile's (1996) componential theory of creativity, held that external environmental factors (perceived support for creativity) can affect a person's creative performance through the influence of his/her personal affective factors (savoring ability). Because the ability to savor differs among people, the study was designed to explore the roles of mediation its multiple facets play between perceived support for creativity and individual creativity. The results showed that perceived support for creativity has a positive effect on individual creativity when mediated by in-the-moment savoring. This conclusion provides savoring with empirical support in theories of creativity and accentuates its significance in nurturing creative talents.

Moreover, the findings bear important educational implications for fostering creative talents. Since now that students' perceived support for creativity can positively influence their savoring capacity (in all three forms), we can improve students' creative performance by increasing their ability to savor through establishing a creativity-supportive school environment, forming mutually supportive and encouraging teacher-teacher and teacher-student relationships, promoting mutually helpful and cooperative interactions between students, and encouraging them to share their creative accomplishments socially**.** Based on the finding of savoring the moment being the only form of savoring that effectively mediates the relationship between perceived support for creativity and individual creativity, schools can incorporate methods of enhancing students' savoring capacity into their creative curriculum to help students steadily increase their ability to savor. For example, students can be encouraged to take some time off daily to do the following savoring-enhancing exercises: (1) Daily vacation exercise: savoring the small moments/ little things in life; (2) Life review exercise: linking positive associations in the mind; (3) Camera exercise: focusing mindfully on ways that give ordinary objects pleasant visual effects (Bryant & Veroff, 2007).

Despite of the value in its theoretical and educational implications, as well as the effort in being meticulous in the process of its execution, this study nevertheless has the following limitations: (1) The participants were limited to fourth-year design-major students from universities of science and technology in Taiwan, the results might not be generalizable to students of other years, majors, or countries; (2) The measures/scales used were all

developed by Western researchers. In spite of their proven reliability and validity, they are inevitably restricted by their social and cultural limitations and thereby opening the door to possible measurement errors; (3) Individual creativity was gauged by self-report measures, so the responses were susceptible to social desirability bias. This study recommends that future studies incorporate information/data from various sources, including objective indicators (such as creative works and winning records from creative competitions, etc.) or evaluations of creative performances (from teachers and team members, etc.) in their assessment of individual creativity. This will enable the researchers to obtain a more comprehensive evaluation of creativity, and to avoid probable measurement error stemming from social desirability bias.

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