Individual Differences and the Creative Process: Implications for Talent Identification

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Session Abstract

Successful organizations must consider the individual characteristics that facilitate creativity when designing talent identification and development systems. Previous research has often focused on the relationship between individual differences and creative outcomes, while ignoring theory and research indicating creativity is best understood as a complex process. Further, this research has failed to acknowledge that, from conception to final implementation, successful execution of creative ideas are often the result of teams rather than just the actions of one individual. In this symposium, a diverse group of scientists and practitioners will illustrate how individual differences can predict individual and team creative processes.

Session Summary

Defined as the generation or production of novel, appropriate, and useful ideas (Amabile, 1982; 1983), research has shown that creativity is advantageous for individuals and organizations (James, Clark, & Cropanzano, 1999; Shalley, Zhou, & Oldham, 2004). It is an avenue by which organizations can adapt to global and economic pressures to ensure longevity by creating short-term and lasting value (Madjar, Greenberg, & Chen, 2011; George, 2007). Given the growing complexities within organizations, creativity may now be more important to organizational success than ever before (Robledo, Hester, Peterson, & Mumford, 2012).

Creativity is found at the intersection of four interrelated strands including (1) personal characteristics, (2) the creative process, (3) pressures on creativity, and (4) creative products (Rhodes, 1961). In an effort to improve talent identification, many researchers have focused on the relationship between individual differences and creativity. For example, individual differences such as personality (James, Broderson, & Eisenberg, 2004), intrinsic motivation (George, 2007), creative self-efficacy (Tierney & Farmer, 2002, 2011; Gong, Huang, & Farth, 2009), affective types (To, Fisher, Ashkanasy, & Rowe, 2012), and tolerance for ambiguity (Oldham & Cummings, 1996) all reflect personal characteristics that have been found to impact creativity. However, most of this research has either focused on the relationship between individual differences and creative outcomes (e.g., Feist, 1998) or the relationship between individual differences and the idea generation step in the creative process as a proxy for creativity (e.g., McCrae, 1987; Runco, 2010). Therefore, this research largely ignores other critical components of the creative process (Mumford, Medeiros, & Partlow, 2012; Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991).

By ignoring the complexity of the entire creative process, much of the existing research has also ignored that successful execution of creative ideas are often the result of teams rather than just the actions of one individual (Paulus, 2000). Therefore, individual differences impact not only an employee's ability to work through each stage, but also his or her ability to work with others through remaining stages. Therefore, organizations seeking to improve creativity should consider individual differences that impact each stage of the creative process. Collectively, the following presentations offer insight into how individual differences can be used to this end.

Nei, Nei, Gibson, and Macdougall present results linking a range of individual characteristics to a range of stages in the creative process. For example, while the tendency to

care about and empathize with others is most important for stages that involve communicating with others (e.g., information gathering, idea evaluation), a strong work ethic and adherence to structured processes is more important for planning phases that lead to idea implementation.

The Cushenbery, Lovelace, and Hunter paper further highlights the importance of individual differences and social context t by considering the role both play in the vetting practices that occur as ideas are moved through the phases of the creative process (Mumford & Hunter, 2005). Specifically, they examine the role low agreeableness, or being a "jerk", plays in the transference of ideas from individual generation to group utilization and how the originality of others' ideas and the supportiveness of the environment can interact with this relationship.

The Friedrich, Peterson, and Van Doorn paper extends this topic to examine the impact creative individual differences have on team creative processes. By collecting initial information on individual differences in creative capacities, such as divergent thinking and creative process engagement, as well as continual individual- and team-level creative process information in their longitudinal study, the authors will discuss how individual differences impact team innovative processes over time.

Finally, Dr. Adrian Furnham will serve as our discussant. To conclude the symposium, he will discuss the research discussed by our presenters and the broader implications of this topic for organizations seeking to improve creativity through talent identification. Dr. Furnham brings considerable expertise to the discussion as he has published several articles on the topic (e.g., Batey & Furnham, 2006; Furnham & Bachtiar, 2008; Furnham, Batey, Anand, & Manfield, 2008).

This symposium brings together a diverse group of scientists and practitioners to illustrate how individual difference assessment can predict individual and team creative processes. Following individual presentations and Dr. Furnham's commentary and insights, we will open the session to questions and participation from audience members.

References

Amabile, T. M. (1982). Social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology, 43*(5), 997-1013.

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology, 45*(2), 357-376.

Batey, M., & Furnham, A. (2006). Creativity, intelligence, and personality: A critical review of the scattered literature. *Genetic, Social, and General Psychology Monographs, 132*(4), 355-429.

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review, 2*(4), 290-309.

Furnham, A., & Bachtiar, V. (2008). Personality and intelligence as predictors of creativity. *Personality and Individual Differences, 45*(7), 613-617.

Furnham, A., Batey, M., Anand, K., & Manfield, J. (2008). Personality, hypomania, intelligence and creativity. *Personality and Individual Differences, 44*(5), 1060-1069.

George, J. M. (2007). Creativity in organizations. *The Academy of Management Annals, 1*(1), 439-477.

Gong, Y., Huang, J. C., & Farh, J. L. (2009). Employee learning orientation, transformational leadership, and employee creativity: The mediating role of employee creative self-efficacy. *Academy of Management Journal, 52(4),* 765–778.

James, K., Brodersen, M., & Eisenberg, J. (2004). Workplace affect and workplace creativity: A review and preliminary model. *Human Performance, 17*(2), 169-194.

James, K., Clark, K., & Cropanzano, R. (1999). Positive and negative creativity in groups, institutions, and organizations: A model and theoretical extension. *Creativity Research Journal, 12*, 211–226.

Madjar, N., Greenberg, E., & Chen, Z. (2011). Factors for radical creativity, incremental creativity, and routine, noncreative performance. *Journal of Applied Psychology, 96*(4), 730-743.

McCrae, R. R. 1987. Creativity, divergent thinking, and openness to experience. *Journal of Personality and Social Psychology, 52*, 1258-1265.

Mumford, M. D., & Hunter, S. T. 2005. Innovation in organizations: A multi-level perspective on creativity. In F. J. Yammarino & F. Dansereau (Eds.), *Research in multi-level issues: Volume IV (*pp. 11- 74). Oxford, England: Elsevier.

Mumford, M. D., Medeiros, K. E., & Partlow, P. J. (2012). Creative thinking: Processes, strategies, and knowledge. *The Journal of Creative Behavior, 46*(1), 30-47.

Mumford, M. D., Mobley, M. I., Reiter-Palmon, R., Uhlman, C. E., & Doares, L. M. (1991). Process analytic models of creative capacities. *Creativity Research Journal, 4*(2), 91-122.

Oldham, G. R., & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal, 39*, 607-634.

Paulus, P. B. (2000). Groups, teams, and creativity: The creative potential of idea-generating groups. *Applied Psychology: An International Review, 49,* 237-262.

Rhodes, M. (1961). An analysis of creativity. *The Phi Delta Kappan, 42*(7), 305-310.

Robledo, I. C., Hester, K. S., Peterson, D. R., & Mumford, M. D. (2012). Creativity in organizations: Conclusions. In M. D. Mumford (Ed.), *Handbook of Organizational Creativity* (pp. 707-725). London: Academic Press.

Runco, M. A. (2010). *Divergent thinking, creativity, and ideation.* In J. C. Kaufman & R. J. Sternberg (Eds.) The Cambridge handbook of creativity (pp. 413-446). New York: Cambridge University Press.

Shalley, C. E., Zhou, J., & Oldham, G. R. (2004). Effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management, 30,* 99-118.

Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Potential antecedents and relationship to creative performance. *Academy of Management Journal, 45*, 1137-1148.

Tierney, P., & Farmer, S. M. (2011). Creative self-efficacy development and creative performance over time. *Journal of Applied Psychology, 96*(2), 277-293.

To, M. L., Fisher, C. D., Ashkanasy, N. M., & Rowe, P. A. (2012). Within-person relationships between mood and creativity. *Journal of Applied Psychology, 97*(3), 599-612.

Summary of Hogan's Contribution

Our economy continues to transition from one based on physical inputs to one based on intellectual inputs that require creativity (Florida, 2006). As such, when organizations design selection systems and talent development programs, they should consider the individual characteristics that facilitate creativity. Theory and research indicate that creativity is best understood as a process rather than an outcome (Mumford, Medeiros, & Partlow, 2012; Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991). Recent literature on innovation management suggests that (a) multiple individual factors likely contribute to the creative process, (b) often times these factors may conflict, and (c) multiple pathways likely lead to innovation (Bledlow, Frese, Anderson, Erez, & Farr, 2009).

At a broad level, the creative process can be broken down into early and late stages. Early stages consist of problem definition, information gathering, information organization, conceptual combination, and idea generation. Late stages consist of idea evaluation, implementation planning, and solution monitoring (Mumford, et al., 2012; Mumford, et al., 1991). Given the complexity of the creative process and the individual characteristics that facilitate each stage, creativity is more a group than an individual phenomenon (Paulus, 2000). As such, organizations should take a holistic approach to staffing for creativity.

Personality, which concerns individual differences, has received a significant amount of attention by creativity researchers (Feist, 1998). However, the bulk of this research focuses on relationships between personality and creativity outcomes rather than the creative process. In this study, we will demonstrate how personality contributes to different steps in the creative process. We will then discuss how organizations can use these results to inform their selection and talent management processes both from an individual and team perspective. We will conclude with limitations and suggestions for future research.

Current Study

Our sample consisted of 1,148 practicing attorneys who graduated from two large U.S. law schools that were surveyed as part of a larger study (Shultz & Zedeck, 2011). Participants volunteered to complete the Hogan Personality Inventory (HPI; Hogan & Hogan, 2007) and the Hogan Development Survey (HDS; Hogan & Hogan, 2009). The HPI is based on the Five-Factor Model and is designed to predict occupational success. The HDS is a measure of dysfunctional behavioral tendencies that predict performance risk in working adults. Participants were asked to identify up to four individuals (two peers, two supervisors) to evaluate their legal performance using a previously validated 26-item behaviorally anchored rating scale (BARS) designed to assess lawyer effectiveness (Shultz & Zedeck, 2011; see Figure 1 for example). A panel of Industrial-Organizational psychologists familiar with the BARS and the creativity literature independently coded each of the 26 BARS into one creative process step (see Table 1). They met to resolve coding discrepancies to reach 100% agreement. Of the 26 BARS, 14 fit into one creative process step (see Table 1). When multiple BARS mapped to one step, we computed an average score for that process. Next, we aggregated peer and supervisor ratings to compute an overall performance score on each creative process step.

Correlation and regression analysis results for the HPI (Tables 2 & 3) indicate that multiple personality characteristics are related to creative performance. Overall, Ambition and Sociability had the most consistent relationship across many creative process steps, with Ambition positively predicting creative process performance and Sociability hindering it. This is particularly interesting because Ambition and Sociability are derived from the same Extraversion factor in traditional five factor models (Hogan & Hogan, 2007). While items were written to reflect standard FFM dimensions during initial HPI development (Goldberg, 1992), analyses indicated that the standard FFM dimension called Surgency/Extraversion had two components that were conceptually unrelated: Ambition representing the initiative component and Sociability representing the gregariousness component. Therefore, the current finding may explain mixed results in previous research (e.g., Feist, 1998) investigating the relationship between Extraversion and creativity. In other words, while some aspects of Extraversion may help creative performance, other aspects may hurt it. Further, this aligns with the perspective that less gregarious individuals can be strong performers (e.g., Warren Buffet who is shy, yet ambitious) despite popular beliefs on the matter (Cain, 2013). Furthermore, splitting Surgency into two constructs may better predict some performance aspects (e.g., Do & Minbashian, in press).

HPI results also suggest that certain personality characteristics are more important at various stages in the creative process. For example, Interpersonal Sensitivity appears to be important for stages where communicating with others is important (e.g., information gathering, idea evaluation), especially in team settings. Also, Prudence appears to be important for idea evaluation, information organization, and planning phases, indicating that detail orientation is important at these stages in the process.

HDS results (Tables 4 & 5) indicate that, surprisingly, higher scores on Imaginative are detrimental to early stages of the creative process. This suggests that eccentric behavior may derail the creative process early on because individuals struggle to practically solve a problem and may get derailed by irrelevant information. Conversely, those with higher Diligent scores struggle in the idea generation phase, perhaps because they focus on unimportant details and strive for perfection rather than simply generating ideas. Higher Excitable scores are detrimental at later stages in the creative process where follow through is important, likely because Excitable individuals lack persistence, get frustrated quickly, and are easily disappointed (Hogan & Hogan, 2007).

Taken together, these results suggest that the relationship between personality and creativity is more complex than previous research suggests (e.g., Feist, 1998). For example, while Diligence is valuable at the information gathering stage, it may be detrimental at the idea generation stage. Therefore, organizations should consider the entire creative process when designing selection and talent management programs. One strategy is to build teams with diverse personality profiles to balance strengths across team members. We will discuss the implications of these results in light of limitations of the current research and suggestions for further examining the impact of individual differences on the creativity process.

References

Bledlow, R., Frese, M., Anderson, N., Erez, M., & Farr, J. (2009). A dialectic perspective on innovation: Conflicting demands, multiple pathways, and ambidexterity. *Industrial and Organizational Psychology, 2,* 305-337.

Cain, S. (2013). *Quiet: The power of introverts in a world that can't stop talking.* Random House LLC.

Do, M. H., & Minbashian, A. (in press). A meta-analytic examination of the effects of the agentic and affiliative aspects of extraversion on leadership outcomes. *The Leadership Quarterly.*

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, *2*(4), 290-309.

Florida, R. (2006). The flight of the creative class: The new global competition for talent. *Liberal Education*, *92*(3), 22-29.

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological assessment*, *4*(1), 26.

Hogan, R., & Hogan, J. (2007). *Hogan Personality Inventory manual* (3rd ed.). Tulsa, OK: Hogan Assessment Systems.

Hogan, R., & Hogan, J. (2009). *Hogan Development Survey manual* (2nd ed.). Tulsa, OK: Hogan Press.

Mumford, M. D., Medeiros, K. E., & Partlow, P. J. (2012). Creative thinking: Processes, strategies, and knowledge. *The Journal of Creative Behavior*, *46*(1), 30-47.

Mumford, M. D., Mobley, M. I., Reiter-Palmon, R., Uhlman, C. E., & Doares, L. M. (1991). Process analytic models of creative capacities. *Creativity Research Journal*, *4*(2), 91-122.

Paulus, P. B. (2000). Groups, teams, and creativity: The creative potential of idea-generating groups. Applied Psychology: *An International Review, 49, 237*-262.

Shultz, M. M., & Zedeck, S. (2011). Predicting lawyer effectiveness: Broadening the basis for law school admission decisions. *Law & Social Inquiry*, *36*(3), 620-661.

Table 1
BARS Factors coded for Creative Process Step

	Creative Process Steps							
	Problem Definition	Information Gathering	Information Organization	Conceptual Combination	Idea Generation	Idea Evaluation	Implementation Planning	Solution Monitoring
BARS Factors								
1. Analysis and Reasoning				X				
2. Creativity/Innovation					X			
3. Practical Judgment						X		
4. Building Client Relationship & Providing Counsel and Advice		X						
5. Fact Finding		X						
6. Researching the Law			X					
7. Listening								X
8. Influencing & Advocating							X	
9. Questioning & Interviewing		X						
10. Negotiation Skills								X
11. Strategic Planning							X	
12. Diligence			X					
13. Ability to See the World Through the Eyes of Others						X		
14. Problem Solving	X							

Note. Expert judges were unable to match 12 of the 26 BARS factors to a Creative Process Step.

Table 2

Correlations between Overall Creative Process Performance Scores and Hogan Development Survey Scales

Variable	N	Adjustment	Ambition	Sociability	Interpersonal Sensitivity	Prudence	Inquisitive	Learning Approach
Problem Definition	948	.12**	.10**	-.06	.04	.09**	-.01	.10**
Information Gathering	951	.12**	.12**	-.05	.10**	.10**	.01	.04
Information Organization	953	.06	.06	-.12**	.00	.16**	-.05	.05
Conceptual Combination	952	.08**	.08*	-.10**	-.02	.08*	.03	.10**
Idea Generation	906	.09**	.13**	-.04	.02	.02	.03	.06
Ideal Evaluation	949	.10**	.02	-.03	.10**	.10**	-.02	.06*
Implementation Planning	951	.11**	.13**	-.06	.03	.11**	-.01	.09**
Solution Monitoring	948	.13**	.09**	-.04	.09**	.10**	-.04	.04

Note. Creative Process Performance Scores were computed by averaging ratings across both peers and supervisors; **= Correlation is significant at the .01 level (2-tailed); *=Correlation is significant at the .05 level (2-tailed).

Table 3
Stepwise Regression for Creative Process Steps with HPI Scales

Outcome	Predictors in Final Model	β	R	R^2	Adjusted R^2	Std. Error of the Estimate
Problem Definition			.151	.023	.021	.438
	Adjustment	.115				
	Learning Approach	.093				
Information Gathering			.180	.032	.028	.388
	Adjustment	.030				
	Ambition	.120				
	Sociability	-.122				
	Interpersonal Sensitivity	.093				
Information Organization			.197	.039	.036	.430
	Prudence	.123				
	Sociability	-.113				
	Ambition	.097				
Conceptual Combination			.180	.033	.029	.469
	Learning Approach	.095				
	Sociability	-.143				
	Ambition	.118				
Idea Generation			.156	.024	.022	.530
	Ambition	.161				
	Sociability	-.097				
Idea Evaluation			.140	.020	.017	.427
	Prudence	.084				
	Interpersonal Sensitivity	.073				
	Learning Approach	.066				
Implementation Planning			.203	.041	.037	.430
	Ambition	.149				
	Sociability	-.090				
	Learning Approach	.082				
	Prudence	.081				
Solution Monitoring			.130	.017	.016	.420
	Adjustment	.130				
	Learning Approach	.093				

Note: N = 906-953. All other statistics from stepwise regression analyses can be provided upon request. All final models had significant *F* Change.

Table 4

Correlations between Overall Creative Process Performance Scores and Hogan Development Survey Scales

Variable	N	Excitable	Skeptical	Cautious	Reserved	Leisurely	Bold	Mischievous	Colorful	Imaginative	Diligent	Dutiful
Problem Definition	304	-.13*	-.05	-.02	-.03	.01	-.01	.01	.02	-.15*	-.08	-.09
Information Gathering	304	-.12*	-.01	.01	-.14*	.06	.01	.01	.03	-.11*	-.02	-.02
Information Organization	306	-.10	.08	.05	-.03	.10	.07	-.02	-.04	-.13*	.11	-.05
Conceptual Combination	307	-.09	.00	.02	.03	.07	.00	.00	.01	-.09	-.11	-.12*
Idea Generation	291	-.15*	-.06	.02	-.02	.05	-.02	.01	-.01	-.10	-.14*	-.09
Ideal Evaluation	303	-.14*	-.04	.02	-.13*	.04	.00	-.03	-.04	-.10	-.02	-.03
Implementation Planning	305	-.10	.00	-.02	-.06	.02	.09	.04	.02	-.10	-.03	-.02
Solution Monitoring	305	-.17**	-.03	-.02	-.13*	.02	.07	.06	.04	-.02	-.04	-.04

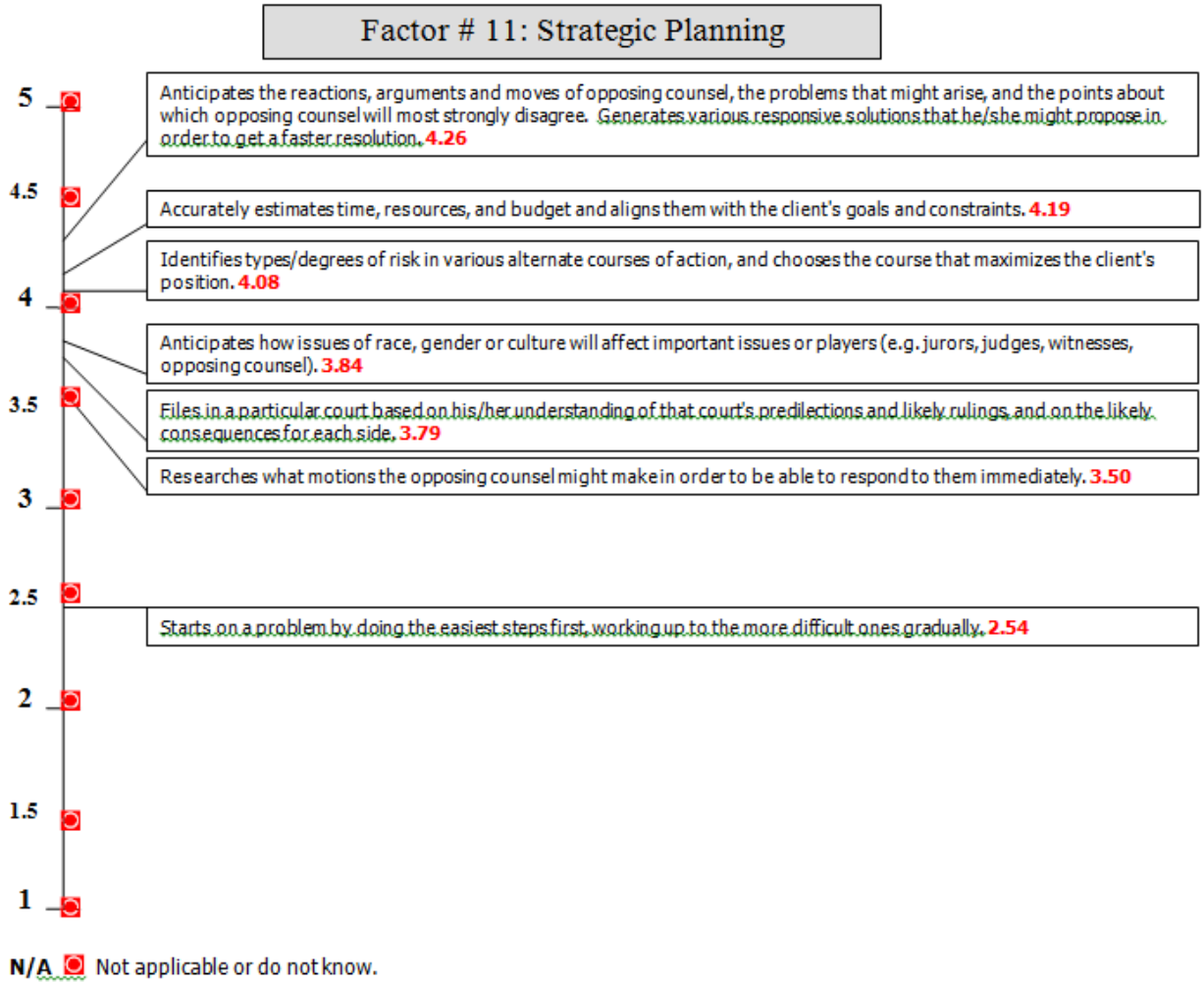
Note. Creative Process Performance Scores were computed by averaging ratings across both peers and supervisors; **= Correlation is significant at the 0.01 level (2-tailed); *=Correlation is significant at the 0.05 level (2-tailed).

Table 5
Stepwise Regression for Creative Process Steps with HDS Scales

Model	Predictors	β	R	R^2	Adjusted R^2	Std. Error of the Estimate
Problem Definition			.194	.038	.031	.460
	Imaginative	-.143				
	Excitable	-.123				
Information Gathering			.185	.034	.028	.393
	Reserved	-.147				
	Imaginative	-.124				
Information Organization			.178	.032	.025	.440
	Imaginative	-.139				
	Diligent	.119				
Conceptual Combination			.123	.015	.012	.459
	Dutiful	-.123				
Idea Generation			.227	.052	.042	.537
	Excitable	-.202				
	Diligent	-.141				
	Cautious	.140				
Idea Evaluation			.142	.020	.017	.403
	Excitable	-.142				
Solution Monitoring			.170	.029	.026	.373
	Excitable	-.170				

Note: N = 291-307. All other statistics from stepwise regression analyses can be provided upon request. All final models had significant *F* Change. No model was obtained for Implementation Planning.

Figure 1
Example BARS factor



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