Golubovich, J., Su, R., & Robbins, S. B. (in press). Establishing a standards framework and benchmarks for workplace readiness and success: Bridging the education to work divide. In J. Burrus, K. D. Mattern, B. Naemi, & R. D. Roberts (Eds.), *Building better students: Preparation for the workforce*. New York, NY: Oxford University Press.

Griffin, P., McGaw, B., & Care, E. (Eds.). (2012). *Assessment and teaching of 21st century skills*. New York, NY: Springer.

Landis, R. S., Fogli, L., & Goldberg, E. (1998). Future-oriented job analysis: A description of the process and its organizational implications. *International Journal of Selection and Assessment*, *6*(3), 192–197. doi:10.1111/1468-2389.00089

Murphy, K. (2003). *Validity generalization: A critical review*. Mahwah, NJ: Erlbaum.

National Research Council. (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. Washington, DC: The National Academies Press.

Neubert, J. C., Mainert, J., Kretzschmar, A., & Greiff, S. (2015). The assessment of 21st century skills in industrial and organizational psychology: Complex and collaborative problem solving. *Industrial and Organizational Psychology: Perspectives on Science and Practice*.

Nye, C. D., Su, R., Rounds, J., & Drasgow, F. (2012). Vocational interests and performance: A quantitative summary of over 60 years of research. *Perspectives on Psychological Science, 7*, 384–403. doi:10.1177/1745691612449021

Ryan, A. M., & Ployhart, R. E. (2014). A century of selection. *Annual Review of Psychology, 65*, 693–717. doi:10.1146/annurev-psych-010213-115134

Scherbaum, C. A. (2005). Synthetic validity: Past, present, and future. *Personnel Psychology, 58*(2), 481–515. doi:10.1111/j.1744-6570.2005.00547.x

Van Iddekinge, C. H., Putka, D. J., & Campbell, J. P. (2011). Reconsidering vocational interests for personnel selection: The validity of an interest-based selection test in relation to job knowledge, job performance, and continuance intentions. *Journal of Applied Psychology, 96*(1), 13–33. doi:10.1037/a0021193

Do We Really Need New Constructs? An Argument for Adapting Individual Predictors to Dynamic Environments

Lebena Varghese, Meghan I. H. Lindeman, and Alecia M. Santuzzi
Northern Illinois University

Neubert, Mainert, Kretzschmar, and Greiff (2015) argue that the variable and dynamic nature of new job roles requires employees to demonstrate skills such as complex problem solving (CPS) or collaborative problem solv-

Lebena Varghese, Meghan I. H. Lindeman, and Alecia M. Santuzzi, Department of Psychology, Northern Illinois University.

Correspondence concerning this article should be addressed to Lebena Varghese, Department of Psychology, Northern Illinois University, Dekalb, IL 60115. E-mail: Z1714894@students.niu.edu

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press

ing (ColPS). We argue that assessing CPS and ColPS in place of traditional assessment would be criterion deficient. We argue that traditional personnel assessments are important even for 21st century jobs. In this commentary we attempt to (a) highlight the contribution of currently assessed individual predictors and job skills in relation to personnel selection and (b) discuss how those traditional assessments can inform performance even in dynamic environments, such as those experienced in team-based work.

The Importance of Individual Predictors

In the focal article, the authors argue for the importance of direct assessment of CPS and ColPS in the selection process. We agree that these skills, along with individual predictors, may have a significant place in personnel selection. However, we disagree with the stance taken in the focal article that individual predictors are less effective than are CPS and ColPS with regard to predicting future performance. Individual predictors such as personality variables and cognitive ability are the building blocks of selecting personnel (Guion & Highhouse, 2006). Such predictors may even serve as the building blocks for CPS and ColPS.

Drawing from the theory of individual differences, individual dispositions (personality variables) and fundamental capacities (cognitive abilities) influence job performance through variables such as job knowledge and skills (Motowildo, Borman, & Schmit, 1997). According to the authors of the focal article, CPS skills are defined as an individual's ability to solve dynamic, complex problems at an individual level. ColPS skills are defined as an individual's ability to interact with others to tackle dynamic problems at a group level. According to the theory of individual differences, an individual's abilities and personality interact with their environment, giving rise to the acquisition and use of specific job skills, job knowledge, attitudes, and preferences related to the performance (Motowildo et al., 1997). As such, individuals who are selected on the basis of individual predictors are likely to demonstrate higher levels of skills such as CPS and ColPS. Therefore, it may even be superfluous in some instances to assess individual predictors in addition to CPS and ColPS. Rather, we argue that a more effective use of effort would be to investigate a combination of individual predictors that best predict CPS, ColPS, and other specific skills that might become relevant as job environments change.

Change the Predictive Model Not the Variables

The nature of 21st century work might better be served by considering interactions of individual predictors with work environment factors rather than by creating new constructs. There is some evidence that job skills are often

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press

proximal to job performance rather than predictors of job performance. Indeed, the strong positive relationship between cognitive ability and task performance is mediated by task skill, task habit, and task knowledge (Motowildo et al., 1997). Additionally, the robust positive relationship between personality dispositions (e.g., agreeableness, conscientiousness, extraversion) and contextual performance is mediated by contextual skills, knowledge, and habits (Motowildo et al., 1997).

Furthermore, a meta-analytic review demonstrated that job skills and job knowledge mediated the relationship between cognitive ability and supervisory ratings (Hunter, 1986). Like job skills, it seems that CPS and ColPS are not predictors of performance (personality/cognitive ability) but instead are proximal to the job performance realm. Skills emerge when an individual's basic tendencies and capacities interact with the environment. Therefore, assessing and selecting for these skills at an individual level may be misleading. It is likely that these are skills that will be acquired through on-the-job trainings, when the individual's dispositional traits interact with the context of their job environment. As such, prediction of whether CPS and ColPS skills will emerge likely relies on individual predictors, but with more complex interaction effects with the work environment.

The Role of Context

It is important to consider how individual tendencies and the work environment interact to promote acquisition of CPS and ColPS. Assessing individual predictors in isolation or assessing broader categories of skills is unlikely to aid in predicting group performance because the context is not considered. It is crucial to understand how these individual traits function within a group context. According to the person–situation interaction model proposed by Tett and Burnett (2003), situation specificity colors personality trait activation. The model postulates that expression of traits is contingent on situational cues that may stem from tasks, from social interactions or the organization as a whole. For example, the social factors that trigger trait activation include expectations and needs of subordinates, supervisors, and peers. For instance, traits that make an individual successful under one type of supervisor will be different from the traits that make an individual successful under a different type of supervisor. As such, an individual with a high need for autonomy will likely thrive under the supervision of a democratic leader (activation of the trait) but wither under the supervision of an authoritarian leader (suppression of the trait). Similarly, being methodical is often good in the field of accounting. However, accountants who are too methodical may be indecisive in pressing times due to paying too much attention to detail.

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press

As shown in these examples, trait expression is highly contingent on the job context. The authors of the focal article assert that ColPS are skills that are stable and persistently associated with the individual across contexts. Given the past research suggesting that such skills are activated and influenced by the environment, we must question this assertion. It seems that there may be characteristics that predict an individual's ability to perform in a group, but the performance of each group is heavily influenced by the context of the group. Therefore, assuming that ColPS skills are stable aspects of an individual may not be realistic as the varying context and situation has a very powerful influence on the performance of the group and the ability for the individual to influence the group.

Also, assessing CPS and ColPS in advance might have challenges with the construct validity. Although people tend to perceive that they are more productive when working in groups, there is some evidence that groups are not always more productive than individuals working alone (Mullen, Johnson, & Salas, 1991; Pauhus, Dzindolet, Poletes, & Camacho, 1993). Research shows that characteristics of the task are powerful predictors of how the group will perform. For instance, research has shown that groups are more productive than individuals are when working on difficult tasks, whereas individuals are more productive than groups are when working on easy tasks (Jackson & Williams, 1985). Additionally, research has shown that brainstorming alone is more productive than brainstorming in a group (Pauhus et al., 1993). These findings suggest that in some instances, working in groups facilitates performance, but this effect is highly dependent on the task context. Therefore, even if individuals are measured on CPS and ColPS in advance, it might not adequately take into account the context of group interactions.

Furthermore, there are some characteristics of groups that likely predict performance independent of the skills that group members possess. For example, research shows that group cohesion (e.g., liking among group members) is related to group performance (Hogg & Hains, 1998). As such, groups in which the group members like each other (high interpersonal cohesion) make higher quality decisions than do groups that have low interpersonal cohesion (Hogg & Hains, 1998). However, groups in which the group members like the group (high group cohesion) make lower quality decisions than do groups that have low group cohesion (Hogg & Hains, 1998). These findings show the important role that the context plays in determining how groups perform. Group cohesion is a characteristic of the group that emerges from interaction between group members. Group cohesion is highly dependent on the context, therefore selecting for skills within the context of one group is unlikely to translate to other contexts outside that one particular group.

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press

Some assessments of CPS and ColPS might involve bringing the incumbents into an already formed group to assess how they interact in a groups setting. Although this is an interesting idea, there is some evidence that newcomers entering a formed group face some challenges that are isolated to their status as newcomers. As such, the influence of newcomers entering already established groups is highly dependent on the context, perhaps more so than characteristics of the individual. In one study, participants were assigned to be newcomers in a group of three people working on a task that required solving a problem (Choi & Levine, 2004). The impact of the newcomer was highly dependent on the context of the group that they joined. Specifically, the group listened to the newcomer when the group had been assigned their previous strategy or when the group had previously failed to accomplish the task. These findings suggest that a newcomer's role in a group is dependent on the context of the established group rather than on the characteristics of the newcomer. Undoubtedly, the ability of individuals to successfully work in teams is heavily governed by the context of the group that they are entering. The authors of the focal article assert that directly assessing CPS and ColPS will benefit selection practices; however, these constructs are unlikely to provide a holistic picture of future performance. Individual predictors are stable and when measured in conjunction with contextual variables will accurately predict future performance.

More Specific Predictors Are Less Useful in Dynamic Work Environments

Creating new constructs does not solve the concern about predicting behavior in dynamic work environments. Selecting personnel on the basis of job specific skills or job knowledge only guarantees that individuals are able to showcase skill and knowledge at the time of testing. This may not be the ideal method of selection. This issue may be exacerbated when selecting for entry-level candidates who may not demonstrate proficiency at the time of testing. However, these entry-level candidates have the abilities and dispositions to acquire these skills through training (Lievens, Harris, Van Keer, & Bisqueret, 2003). Hence, if we intend to select for sustained optimal performance, we ought to tap into aptitude and motivation, which are predicted by abilities and personality dispositions (Guion & Highhouse, 2006). Selecting personnel on the basis of broad categories of skills, as suggested by the focal article, might be shortsighted. We argue that the best approach to deal with this ever-changing landscape is to select individuals on the basis of stable characteristics such as cognitive ability and dispositional willingness depicted by personality variables to perform the job. Furthermore, it seems that individual predictors already successfully tap into what predicts CPS and ColPS and have the advantage of being broad enough to apply to various changes in work contexts that might occur.

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press

We believe that past research provides ample support for the continued use of individual predictors in dynamic work contexts. Individual traits have been shown to be instrumental to predicting success in an interactive and collaborative environment. For instance, individual personality traits such as conscientiousness when aggregated at the team level are strong predictors of team performance and team effectiveness (Bell, 2007). Research also shows that lower order personality facets predict an employee's ability to thrive in a team environment. For instance, "adjustment" (a facet of emotional stability) and "flexibility" (a facet of openness to experience) are critical predictors of being a team player (Driskell, Goodwin, Salas, & O'Shea, 2006). Further, dominance, a lower facet of extraversion, is unlikely to promote interpersonal relationships within a collaborative context. However, dominance is likely to positively influence making assertive choices for the team, which may benefit performance. Digging even deeper into personality variables will help clarify the dimensions that are most important for promoting CPS and ColPS.

Similarly, working to understand what individual abilities are most predictive for promoting CPS and ColPS will aid selection practices. Already, cognitive ability has been shown to predict an employees' ability to perform tasks that are ill-defined and complex in nature (i.e., adaptability), a construct seemingly analogous to CPS. It is important to note, research indicates that adaptability is a function of individual predictors (i.e., general mental ability, openness to experience and conscientiousness; LePine, Colquitt, & Erez, 2000). Research also shows individuals with higher cognitive ability make sound decisions when completing routine tasks and adapt well to changes in the task requirements (LePine et al., 2000). Additionally, research demonstrates that teams with higher average cognitive ability are more successful at performing variable tasks (LePine, 2003). When met with a task change, team members who have high cognitive ability are able to efficiently adapt to the change and integrate their knowledge with the knowledge of their teammates to understand the new task requirements (LePine, 2003). The above examples underscore the importance of having broad, stable individual predictors and the influence of context in shaping the expression of these predictors. Alternatively, assessing for specific predictors, such as skills, may narrow the score of assessment too much, rendering it less effective.

Conclusion

We aimed to highlight the value of individual predictors and job-related skills in the process of personnel selection. Specifically, we argue that broader individual predictors, as have been validated in past research, are better

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press

equipped to predict dynamic work contexts that are evident in 21st century work environments. We believe it would be better to adjust the prediction models to include interactive effects with environmental features than to create new, task-specific assessments to predict such work performance.

References

Bell, S. (2007). Deep-level composition variables as predictors of team performance: A meta-analysis. *Journal of Applied Psychology, 92*, 595–615. doi:10.1037/0021-9010.92.3.595

Choi, H., & Levine, J. (2004). Minority influence in work teams: The impact of newcomers. *Journal of Experimental Social Psychology, 40*(2), 273–280. doi:10.1016/s0022-1031(03)00101-x

Driskell, J., Goodwin, G., Salas, E., & O'Shea, P. (2006). What makes a good team player? Personality and team effectiveness. *Group Dynamics: Theory, Research, and Practice, 10*, 249–271. doi:10.1037/1089-2699.10.4.249

Guion, R., & Highhouse, S. (2006). Assessing via tests. In *Essentials of personnel assessment and selection* (pp. 235–257). Mahwah, NJ: Erlbaum.

Hogg, M., & Hains, S. (1998). Friendship and group identification: A new look at the role of cohesiveness in groupthink. *European Journal of Social Psychology, 28*, 323–341.

Hunter, J. (1986). Cognitive ability, cognitive aptitudes, job knowledge, and job performance. *Journal of Vocational Behavior, 29*(3), 340–362. doi:10.1016/0001-8791(86)90013-8

Jackson, J., & Williams, K. (1985). Social loafing on difficult tasks: Working collectively can improve performance. *Journal of Personality and Social Psychology, 49*(4), 937–942. doi:10.1037//0022-3514.49.4.937

LePine, J. (2003). Team adaptation and postchange performance: Effects of team composition in terms of members' cognitive ability and personality. *Journal of Applied Psychology, 88*, 27–39. doi:10.1037/0021-9010.88.1.

LePine, J. A., Colquitt, J. A., & Erez, A. (2000). Adaptability to changing task contexts: Effects of general cognitive ability, conscientiousness, and openness to experience. *Personnel Psychology, 53*, 563–593. doi:10.1111/j.1744-6570.2000.tb00214.x

Lievens, F., Harris, M., Van Keer, E., & Bisqueret, C. (2003). Predicting cross-cultural training performance: The validity of personality, cognitive ability, and dimensions measured by an assessment center and a behavior description interview. *Journal of Applied Psychology, 88*, 476–489. doi:10.1037/0021-9010.88.3.476

Motowildo, S., Borman, W., & Schmit, M. (1997). A theory of individual differences in task and contextual performance. *Human Performance, 10*, 71–83. doi:10.1207/s15327043hup1002_1

Mullen, B., Johnson, C., & Salas, E. (1991). Productivity loss in brainstorming groups: A meta-analytic integration. *Basic and Applied Social Psychology, 12*, 3–23. doi:10.1207/s15324834basp1201_1

Neubert, J., Mainert, J., Kretzschmar, A., & Greiff, S. (2015). The assessment of 21st century skills in industrial and organizational psychology: Complex and collaborative problem solving. *Industrial and Organizational Psychology: Perspectives on Science and Practice*.

Pauhus, P., Dzindolet, M., Poletes, G., & Camacho, L. (1993). Perception of performance in group brainstorming: The illusion of group productivity. *Personality and Social Psychology Bulletin, 19*, 78–89. doi:10.1177/0146167293191009

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press

Tett, R., & Burnett, D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology, 88*, 500–517. doi:10.1037/0021-9010.88.3.500

Complex and Collaborative Problem Solving: New, Unique, and Useful?

In-Sue Oh
Temple University

Neubert, Mainert, Kretzschmar, and Greiff (2015) suggest two individual differences that have been overlooked in the industrial–organizational (I-O) literature (i.e., complex and collaborative problem solving) will be critical in the 21st century workplace. Below, I will briefly summarize some history and empirical findings at odds with Neubert et al.'s (2015) assertions.

First of all, Neubert et al. (2015) argue that I-O psychologists should pay attention to and take advantage of nascent educational research on complex and collaborative problem solving. This argument is quite odd to me given that these two skills, albeit under different names, have been widely studied in I-O psychology, particularly as major assessment center (AC) dimensions since the first industrial use of ACs in 1956 in a study conducted at AT&T (Arthur, Day, McNelly, & Edens, 2003). According to Neubert et al. (2015), complex problem solving is defined as "individuals' transversal skill of successfully handling complex and intransparent situations (i.e., those without a readily apparent solution), requiring the active acquisition and application of knowledge in various domains," and collaborative problem solving "is directed toward problem solving in group settings, adding the necessity of social skills to the ones captured by [complex problem solving]" (p. XXX). These are essentially the same as the definitions that have been used for the two corresponding major assessment dimensions: "problem solving" and "consideration/awareness of others" (see Arthur et al., 2003, Table 2, for details). In particular, on the basis of Arthur et al. (2003), Dilchert and Ones (2009, see Table A1, p. 267) explicitly defined problem solving as "[t]he extent to which an individual gathers information; understands relevant technical and professional information; effectively analyzes data and information; generates viable options, ideas, and solutions; selects supportable

In-Sue Oh, Department of Human Resource Management, Fox School of Business, Temple University.

I would like to thank Frank Schmidt for his comments on an earlier version of this article.

Correspondence concerning this article should be addressed to In-Sue Oh, Department of Human Resource Management, Fox School of Business, Temple University, 1801 Liacouras Walk, Philadelphia, PA 19122-6083. E-mail: insue.oh@temple.edu

https://doi.org/10.1017/iop.2015.37 Published online by Cambridge University Press