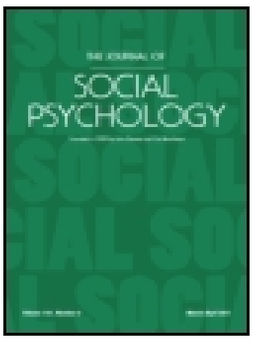

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Task performance influences general self-efficacy, even without increases in the skills required to achieve success

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ABSTRACT

The current article tests whether task performance influences general self-efficacy without increases in the skills required to achieve success. To do so, an experimental design is applied in which participants predict a random future event, and the relationship between prediction task performance and self-efficacy is observed. This article also tests whether this specific performance/self-efficacy relationship is moderated by (a) perceived illegitimacy of predicting the future and (b) self-assessed ability to predict the future. The results show that prediction task performance indeed influences general self-efficacy, and neither of these two moderators has a significant effect on this relationship. Therefore, performance on a low-stakes task does influence general self-efficacy—at least temporarily. More importantly, task performance is shown to influence self-efficacy even without increases in the skills required to achieve success.

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Self-Efficacy; Task Performance; Self-Perceptions

It is often supported that general self-efficacy influences task performance, but there is a growing interest in the inverse of this relationship—the influence of task performance on general self-efficacy (Hardy, 2014; Sitzmann & Yeo, 2013; Vancouver & Purl, 2016). Some support has been provided for this inverse relationship, but authors have expressed uncertainty regarding whether this relationship holds across various conditions and methodological designs. Sitzmann and Yeo (2013) note that "experimental designs are required for establishing unequivocally that past performance causes self-efficacy" (p. 560), but also that,

> "the majority of studies that manipulate self-efficacy rely on mastery experiences or modeling to increase confidence, which confounds increases in self-efficacy with increases in the skills required to achieve success. It is only by experimentally manipulating self-efficacy without affecting performance that we can distinguish the direction of causality in this relationship" (Sitzmann & Yeo, 2013, p. 560).

The authors then contend that this confound also influences studies on the task performance to self-efficacy relationship. This narrow scope of research designs has caused authors to question whether the influence of task performance on general self-efficacy is a substantive relationship, or whether it is nothing more than an artifact of methodological design (Bandura, 2012, 2015; Neal, Ballard, & Vancouver, 2017).

The current article heeds prior calls. We test whether performance on predicting a random future event influences general self-efficacy. This experimental design can investigate the effect of task performance on self-efficacy without "increases in the skills required to achieve success" (Sitzmann & Yeo, 2013, p. 560), and thereby the relationship of interest can be observed with minimal confounding influences. We also test whether this relationship is moderated by (a) perceived illegitimacy of predicting the future and (b) self-assessed ability to predict the future. If performance on predicting a random event

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Supplemental data for this article can be accessed here.

significantly influences general self-efficacy, and neither moderator has an effect, then the influence of task performance on general self-efficacy can be assumed to be real.

In testing these effects, the current study can increase the sophistication of theory surrounding within-person changes in self-efficacy. While it is still debated whether self-efficacy influences task performance (Sitzmann & Yeo, 2013), the current results can more firmly support that task performance influences self-efficacy. Future research and theory can then incorporate possible distal outcomes of task performance through the mediator of self-efficacy, such as motivation and persistence, and perhaps even develop cyclical models in which task performance and self-efficacy influence each other depending on the specific phase of the goal striving process (Bandura, 2012, 2015; Vancouver & Purl, 2016).

Method

Supplemental Material A contains a comprehensive report of the methods and results.

Participants

Participants (N = 335, M_{age} = 34.29, SD_{age} = 10.29, 41% female, 80% American) were recruited from MTurk and provided monetary compensation. MTurk is a Web site that connects individuals willing to perform tasks on a computer, such as taking a survey, with those needing the tasks completed. Prior studies have shown that results obtained from MTurk samples are reliable and valid (Buhrmester, Kwang, & Gosling, 2011; Paolacci & Chandler, 2014; Shapiro, Chandler, & Mueller, 2013). All participants that did not follow all study procedures (18) or failed any attention checks (31) were removed. Thus, our original sample size of 384 participants was reduced to 335 participants.

Procedure

Participants gained access to the survey via MTurk and completed the study online. They first provided their informed consent and completed a pre-questionnaire.

Next, participants completed the first prediction task (Task 1), which was closely adapted from prior studies (Bem, 2011; Galak, LeBoeuf, Nelson, & Simmons, 2012; Howard, 2018; Traxler, Foss, Podali, & Zirnstein, 2012). Participants were told,

> "This section tests your ability to correctly predict the future. Twenty words appear below, and five of these words will be presented on the next page. Your task is to select the five words that will appear on the next page. Also, it is absolutely critical that you focus only on this task and do not perform any other tasks (e.g. check email)."

Twenty words were presented, and participants selected five of these words. Five randomly selected words were shown on the following page, which participants were asked to type.

Participants then completed the second prediction task (Task 2), which was closely adapted from the same prior studies. Participants were told,

> "This section also tests your ability to correctly predict the future. In this section of the survey, you will now be asked to answer twelve similar questions. The questions will ask you to select one of four photos that will appear on the page following the question. Your task is to correctly select the photo that will appear on the page following the question. Again, it is absolutely critical that you focus only on this task and do not perform any other tasks (e.g. check email)."

The task then included twelve trials, in which four pictures were presented at a time. The pictures were mostly of common objects (e.g. chairs, doorknobs, bookshelves) or building interiors. Participants were asked to select which of the four pictures would appear on the following page; then a single picture would be randomly presented on the following page.

Lastly, participants completed a post-questionnaire and were disclosed the purpose of the study.

Stimuli

The same set of words and pictures were used for all participants. The 20 words were taken from the database of Warriner, Kuperman, and Brysbaert (2013), in which participants were asked to rate the valence, arousal, and dominance of 13,915 words. The 20 selected words each had the same valence rating, which was the median of the entire database, and similar arousal and dominance ratings. That was intended to prevent participants from selecting words (or not selecting words) that had any natural appeal (or repulsion) beyond other words. The 48 pictures were taken from the database of Dan-Glauser and Scherer (2011), in which participants were asked to rate the valence, arousal, and the congruence of the represented scene with internal (moral) and external (legal) norms of 730 pictures. The 48 selected pictures were those surrounding the median valence of the database, and they had similar arousal and congruence ratings. Again, this was intended to prevent participants from selecting (or not selecting) pictures that had any natural appeal (or repulsion) beyond other pictures.

The "correct" words and pictures for each participant were randomly selected using the survey software's randomizer, resulting in a different set of correct words and pictures for each participant. While it is believed that no participant was able to view the task before participating, randomizing the correct choices helps ensure that prior knowledge would not aid performance on the task. Further, discrete conditions were not created using this experimental design, but the number of correct predictions is considered a randomized and continuous experimental manipulation in the context of this study.

Measures

Pre-questionnaire

Illegitimacy of Predicting the Future was measured with a three-item scale (α = .70). An example item is, "It is impossible to predict the future."
Self-Assessed Ability to Predict the Future was measured with a three-item scale (α = .88). An example item is, "I believe that I am able to predict the future to a certain extent."

Prediction tasks

Prediction Task 1 Performance was recorded as the number of words correctly predicted.
Prediction Task 2 Performance was recorded as the number of pictures correctly predicted.

Post-questionnaire

Self-Assessed Success was measured with a three-item scale (α = .88). An example item is, "On these two tasks, I think I was able to predict the future better than random chance."
General Self-Efficacy was measured with Chen et al.'s (2001) scale (α = .96).

Results

The relationship of Task 1 performance with self-assessed success was very small and the confidence interval contained zero (r = −.03, 95% CI [−.14, .08]), whereas the relationship of Task 2 performance with self-assessed success was moderate and the confidence interval did not contain zero (r = .33, 95% CI [.23, .42]). This finding suggests that participants' perception of their own success was largely based on their performance on Task 2. For this reason, only Task 2 performance is used in the primary analyses.

The correlation of Task 2 performance and general self-efficacy was .12 (95% CI [.01, .23), suggesting that task performance influenced participant's general self-efficacy. Next, a stepwise regression was performed to determine whether this relationship was influenced by beliefs in the illegitimacy of predicting the future as well as self-assessed ability to predict the future (Table 1).

Table 1. Regression results predicting general self-efficacy.

	β	t	β	t	β	t
1.) Task 2 Performance	.12	2.17*	.12	2.21*	.13	2.36*
2.) Illegitimacy of Prediction			−.07	−1.13	−.06	−.98
3.) Ability to Predict			−.01	−.11	.00	.03
4.) Interaction Term 1[a]					−.05	−.78
5.) Interaction Term 2[b]					−.05	−.87
R^2		.01		.02		.02

[a] Interaction Term 1 represents the interaction between Task 2 and Illegitimacy of Prediction.
[b] Interaction Term 2 represents the interaction between Task 2 and Ability to Predict.
* 95% Confidence interval did not include 0.

When including all three predictors, Task 2 performance remained a significant predictor (β = .12, t = 2.21, 95% CI [.01, .17]) of general self-efficacy, whereas beliefs in the illegitimacy of predicting the future (β = −.07, t = −1.13, 95% CI [−.17, .05]) and self-assessed ability to predict the future (β = −.01, t = −.109, 95% CI [−.10, .09]) were not. Lastly, two interaction terms involving Task 2 performance were created. When including the mean-centered predictors and the two interaction terms, Task 2 performance remained a significant predictor (β = .13, t = 2.36, 95% CI [.02, .18]) of general self-efficacy, whereas the two interaction effects were not (Interaction Term 1, β = −.05, t = −.78, 95% CI [−.09, .04]; Interaction Term 2, β = −.05, t = −.87, 95% CI [−.09, .03]).[1] This finding suggests that the effect of Task 2 performance on general self-efficacy was not moderated by perceived illegitimacy of predicting the future or perceived ability to predict the future.

Discussion

These results indicate that (a) performance on a prediction task significantly influenced general self-efficacy, and (b) this relationship was *not* moderated by perceived illegitimacy of predicting the future or perceived ability to predict the future. Thus, task performance influences general self-efficacy, even without increases in the skills required to achieve success. These results suggest that this relationship holds even in the most conservative situations when using appropriate methodological designs, and therefore even the smallest successes (or failures) should be understood to potentially influence general self-efficacy—at least temporarily.

These results also have implications regarding the sophistication of theory surrounding within-person changes in self-efficacy (Hardy, 2014; Sitzmann & Yeo, 2013; Vancouver & Purl, 2016). These results suggest that the relationship is bidirectional; self-efficacy influences task performance, but task performance also influences self-efficacy. Methodological designs should be applied that can accurately model the effects of this bidirectional relationship. Future theories should likewise incorporate this bidirectional relationship, and newly developed models should recognize that a cyclical effect may exist between the two constructs. It may be particularly beneficial to investigate not *whether* task performance influences self-efficacy (and vice versa), but instead *when* these constructs affect the other. For example, self-efficacy may influence task performance early in the goal-striving process, but task performance may influence self-efficacy in the latter stages.

Future researchers should further probe these effects by testing whether brief manipulations can improve general self-efficacy. For instance, a similar manipulation could be developed in which participants predict a future event, but their choices are automatically presented, causing the participant to believe that their predictions were correct. Longitudinal considerations should also be made regarding these studies, such as whether these effects may last for hours, days, or weeks. It should also be highlighted that the test-retest of the applied self-efficacy measure is typically strong, typically ranging from correlations of .62 to .86 (Chen et al., 2001; Vancouver & Purl, 2016). Despite this strong consistency, even the relatively minor manipulation of the current study produced an observable effect. Therefore, it is likely that future authors can identify many other manipulations to influence self-efficacy.

Researchers should also test for boundary conditions. Those with high levels of certain individual differences, such as instability of self-assessments (Howard, 2017), may be more susceptible to the effects of task performance. Similarly, these results may be even stronger under certain conditions, such as an added monetary reward for correct predictions.

Lastly, some limitations should be noted. First, asking participants about their ability to predict the future may influence their responses to the subsequent measures. Future research should replicate these results without including the pretest measures. Second, self-assessed performance was significantly related to predicting pictures, but not words. It is assumed that participants were more aware of their picture-prediction performance due to the larger visual cue (i.e. seeing a picture vs. reading a word) as well as the greater number of picture trials than word trials. Nevertheless, the current results may have been even stronger if self-assessed performance was predicted by both, and future research should investigate whether correctly predicting pictures indeed has a stronger influence on self-assessed performance than predicting words. Third, general self-efficacy was not measured prior to the prediction tasks, in order to prevent participants from being inadvertently primed. The direction of causality between prediction performance and self-efficacy cannot be entirely concluded, but it is highly unlikely that those high in self-efficacy are more accurate at predicting a future random event. If this is indeed the case, these results may have even larger implications than previously assumed.

Note

1. Interaction Term 1 represents the interaction between Task 2 performance and perceived illegitimacy of predicting the future. Interaction Term 2 represents the interaction between Task 2 performance and perceived ability to predict the future.

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