

Conscientiousness Versus Executive Function as Predictors of Health Behaviors and Health Trajectories

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We welcome the paper by Bogg and Roberts [1] describing the potential role of conscientiousness in explaining health-related outcomes. However, we think that this discussion could be more focused by examining conceptually similar constructs that have documented patterns of connection with these same outcomes. Executive function (EF), for example, is a set of cognitive processes—subsuming behavioral inhibition, working memory, and set shifting—that assist in goal-directed behavior, temporal organization of responses, and future-oriented actions in general [2]. Prior studies have found that individual differences in EF predict medication adherence, health behavioral trajectories, and longevity [3–5]. In a recent study utilizing an age-stratified community sample collected from an urban region in western Canada ($N=208$; age range 19–89), we assessed EF and frequency of fatty food consumption and found that stronger EF (whether measured by Stroop performance or Go–No Go performance) predicted less frequent consumption of such foods, an effect that was independent of demographics, IQ, and BMI [6].

Given the potential conceptual overlap between conscientiousness and EF, we undertook a reanalysis of this dataset, which also included a measure of the Big Five dimensions of personality (the BFI), as well as accelerometer-assessed physical activity. When entering the Big Five variables as a single block in a linear regression analysis, conscientiousness was indeed a significant predictor of physical activity behavior ($\beta=.156$, $p=.045$), but not fatty food consumption frequency ($\beta=-.118$, $p=.132$). Interestingly, conscientiousness was not the most important personality predictor of these outcomes; openness the strongest predictor in absolute terms. More importantly, when conscientiousness and EF were entered in a competitive test, EF was the only significant predictor of unique variability in each behavior (Tables 1 and 2). Finally, when predicting a composite index of both health behaviors combined, EF was a significantly stronger predictor ($\beta=.368$, $p<.001$) than was conscientiousness ($\beta=.187$, $p=.011$; $z=1.868$, $p=.031$).

We believe that although conscientiousness may be a potentially useful heuristic for thinking about health-related behaviors, risks, and outcomes, because there exists empirical overlap with EF—specifically, behavioral inhibition, the most “pure” facet of EF [2]—some of this overlap could be responsible for the association between conscientiousness and outcomes of interest (e.g., health behavior performance). On a theoretical level, this may suggest that some sub-facets of conscientiousness are more predictive of health outcomes than others partially because the global construct itself is not a necessary part of explanatory (or predictive) models.

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Table 1 Executive function versus conscientiousness as predictors of accelerometer-assessed physical activity

| | <i>B</i> | SE | β | <i>t</i> | <i>p</i> value |
|--------------------|----------|------|---------|----------|----------------|
| Conscientiousness | .174 | .116 | .106 | 1.503 | .134 |
| Executive function | .285 | .078 | .258 | 3.673 | <.001 |

N=208; age stratified community sample; mean age=45.21 years; executive function assessed using a composite of Stroop performance (% correct, incongruent trials) and Go-NoGo reaction times; physical activity assessed via tri-axial accelerometer worn for 7 days

However, this aside, there are some advantages of EF on an epistemic level, in that its measurement does not require self-referencing. In order to score highly on a measure of conscientiousness, one must endorse being goal-oriented and following through on one's intentions. Consistent performance of health-related behaviors requires these same things, such that one could very well be considering such behaviors when deciding on a response to items contained in any self-report measure of conscientiousness. Executive function, however, does not suffer from these same measurement problems, and yet dovetails seamlessly with social-cognitive perspectives on self-regulatory process, and provides many avenues for intervention beyond personality change [7].

In summary, we think that the link between conscientiousness and health outcomes is possibly an important one. However, we suggest that there is overlap between conscientiousness and executive function, and that the latter may be a more parsimonious (and powerful) explanatory variable for many health-related phenomena of interest. Careful reconsideration of the conscientiousness dimension from a social neuroscience perspective may be a useful direction forward.

Table 2 Executive function versus conscientiousness as predictors of 2-week fatty food consumption

| | <i>B</i> | SE | β | <i>t</i> | <i>p</i> value |
|--------------------|----------|------|---------|----------|----------------|
| Conscientiousness | -.079 | .062 | -.089 | -1.262 | .209 |
| Executive function | -.153 | .043 | -.251 | -3.577 | <.001 |

N=208; age stratified community sample; mean age=45.21 years; executive function assessed using a composite of Stroop performance (% correct, incongruent trials) and Go-NoGo reaction times; fatty food consumption assessed via fatty food items from the NCI Fat Screener completed for two consecutive weeks

Conflict of Interest The authors have no conflicts of interest to disclose

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