DAILY FEEDBACK OF SELF-CONCEPT CLARITY AND GRIT

by

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This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. Robin Vallacher, Department of Psychology, and has been approved by the members of his supervisory committee. It was submitted to the faculty of the Charles E. Schmidt College of Science and was accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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I want to thank my committee members for all of their guidance, expertise, and support throughout this endeavor. Thanks to my family. Special thanks to my advisor, Robin Vallacher, for his continued support and encouragement.
Self-concept clarity and grit are important constructs in the self-concept and self-regulation domains. Though distinct in their focus on identity and goal processes, self-concept clarity and grit similarly emphasize the extent to which self-views and goal-perseverance are strong, clear, consistent, and unshakeable. We hypothesized self-knowledge and goal-perseverance may be mutually reinforcing given the role of self-knowledge in directing goal pursuit, and of goal pursuit in structuring the self-concept. The present study tested this hypothesis in the form of whether self-concept clarity and grit reciprocally influence one other across time, and was conducted using a daily diary design with 97 college-aged participants across several weeks. Data were analyzed using multilevel cross-lagged panel modeling. Results indicated daily self-concept clarity and grit both had positive influences on each other across time, while controlling for their previous values. The reciprocal influences were also symmetric: self-concept clarity and grit had equally strong influences on each other. The results of the present study are the first to indicate the existence of reinforcing feedback loops between self-concept clarity and grit, and to demonstrate that fluctuations in self-knowledge trigger fluctuations in goal resolve, and vice versa. The results suggest the two are, in part, both causes and consequences of one another.
DEDICATION

This manuscript is dedicated to my wife and my family.
DAILY FEEDBACK OF SELF-CONCEPT CLARITY AND GRIT

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INTRODUCTION

Who one is and how one pursues one’s goals are broad research areas in the topics of self and self-regulation. Although separate questions, whose answers fill handbooks dedicated to either (Hoyle, 2013; Leary & Tangney, 2012; Schwartz, Luyckx, Vignoles, 2011; Vohs & Baumeister, 2011), it is clear the two questions are linked where understanding one involves understanding the other. The present study begins at this point of intersection between self and self-regulation, in addressing how they may mutually affect one another across time.

The present study focuses its hypothesis of feedback relations between self and self-regulation constructs to the important constructs of self-concept clarity and grit. Self-concept clarity epitomizes who one is because it reflects the certainty and coherence of one’s self-concept (Campbell, 1990; Campbell et al., 1996), and does not depend on any specific self-knowledge (e.g., attitude, trait, belief, etc.). Similarly, grit exemplifies how one pursues one’s goals, by measuring one’s tenacity, focus, and determination (Duckworth, Peterson, Matthews, & Kelly, 2007).

Grit is an important predictor of successful goal attainment in a variety of real-world outcomes, such as grades, academy retention, and teacher effectiveness (Duckworth et al., 2007; Duckworth, Quinn, & Seligman, 2009). The results have sparked interest in the mechanisms underlying grit. Gritty individuals are more likely to deliberately practice (Duckworth, Kirby, Tsukayama, Berstein, Ericsson, 2010), have a prosocial transcendent purpose (Yeager et al., 2014), and try harder (Silvia et al., 2013). Grit is highly correlated with conscientiousness, and it has been suggested for this reason grit should be considered a facet of conscientiousness (see Rimfeld, Kovas, Dale, & Plomin, 2016; Roberts, Bogg, Walton, Chernyshenko, & Stark, 2004).
Although the role of the self-concept in grit has been acknowledged, it remains largely unexplored. One intersection is the suggestion that age-related increase in grit may relate to age-related increases in identity commitment (Duckworth & Eskreis-Winkler, 2013). The reasoning is that grit may only become a pragmatic behavioral orientation once a person is aware of and committed to an identity. The finding that identity commitment and self-concept clarity mutually influence one another provides another suggestive link between grit and self-concept clarity (Schwartz et al., 2011).

Self-concept clarity is likely to enhance grit because of the primacy accorded to self-awareness, self-knowledge, and self-certainty in the broader self-regulation literature. For example, having strong self-knowledge enables one to identify and prioritize important goals, choose the most appropriate means to attain them, and how to regulate one’s resources in their pursuit (Higgins, 1996). Certain self-knowledge provides the coherence necessary to pursue self-goals, such as the self-expanding desire to be more (Emery, Walsh, & Slotter, 2014), or a meaningful career (Treadgold, 1999). The most prominent type of self-knowledge, self-esteem, acts both an input and output during goal pursuit (Rhodewalt & Tragakis, 2003). A similar feedback process occurs with desired selves, whereby as desired selves became more important, the motivation to attain it increases, as does the likelihood of its attainment (Higgins, 1996).

Conversely, there is an absence of research concerning the impact of goal pursuit on self-concept clarity. Grit is likely to enhance self-concept clarity because goal pursuit organizes the self-concept. This is evidenced in the nature of self-knowledge, which functions not as an inert description, but rather as a self-regulatory pragmatic tool for navigating one’s world (Higgins, 1996). In emerging adults goal commitment is associated with identity coherence (Schwartz, Cote, & Arnett, 2005). Goals organize the self-concept in the form of possible, desired, and undesired selves (Higgins, 1997; Markus & Nurius, 1986). The pursuit and success of these goals in turn provide the structure and elements of meaningful personal narratives (Baumeister, 1989;
Kleiman, Adams, Kashdan, & Riskin, 2013; McAdams & Pals, 2006). In some frameworks the structure of the self and personality is tantamount to the unique dynamic network of one’s goals and their hierarchical relations (Carver & Scheier, 2003; Karoly, 2010).

Theoretical support for the hypothesized reciprocal relations between self-concept clarity and grit also comes from Action Identification Theory. According to Action Identification Theory how people conceptualize their actions has important regulatory consequences for how they maintain those actions (Vallacher & Wegener, 2012). As people develop action expertise, they shift in identifying their behaviors from lower to higher level terms, which in turn structures high-level thinking of the self. Vallacher and Wegner (1989) showed these relations in their findings that high-level identifiers use higher-level organizing terms to describe themselves (e.g., goals, plans, values, traits) than do low-level identifiers (e.g., gestures), and explains why higher-level identifiers also have higher self-certainty than lower-level identifiers. Therefore, Action Identification Theory predicts that as gritty behavior develops action mastery and experience, one’s action identification levels increase, which in turn provide high-level self-meanings that organize self-concept clarity. Conversely, as self-concept clarity develops, they undertake actions with a focus on outcomes and goals (high-level action identifications) and can thus better regulate the performance of action without being disrupted or distracted.

Self-concept clarity may have a stronger effect on later grit than the effect of grit on later self-concept clarity. This hypothesis is suggested by hierarchical models of self-regulation, whereby lower level goal-directed actions are organized by higher level goals, values, and personality (Carver & Scheier, 2003). Self-concept clarity emerges when these higher levels are certain, integrated, and well-organized. Presumably, a consequence of this clearly organized identity is enhanced self-regulatory abilities, such as the ability to be gritty. Having a clear sense of one’s goals and identity commitments should galvanize the determination to persevere, delay gratification, and maintain focus. It is for this reason Marsh and Craven (2006) describe specific
self-concepts (i.e., an identity commitment) as “a hot variable that makes good things happen, facilitating the realization of full human potential in a range of settings,” when discussing how the self-concept motivates achievement.

In summary, the present study hypothesizes that grit and self-concept clarity mutually influence each other across time. Self-concept clarity increases grit because it specifies a set of clear goals and the self-knowledge for pursuing them. In turn, grit increases self-concept clarity because goal pursuit is a source of personal meaning and understanding. A secondary hypothesis is the effects will be asymmetric, with self-concept clarity having a stronger effect on grit than grit on self-concept clarity. The present study used a daily diary design consistent with previous findings that self-concept clarity and grit exhibit daily variability (Nezlek & Plesko, 2001; Moeller, Gordon, & Robinson, 2015; Schwartz et al., 2011).
METHOD

Participants

Participants were recruited from the undergraduate subject pool and compensated with course credit. At intake, participants answered trait level questionnaires of self-concept clarity (SCC, $M=38.18$, $SD=8.66$, Campbell et al., 1996) and grit (GRIT-S, $M=3.35$, $SD=.61$, Duckworth & Quinn, 2009). A total of 97 students participated in the study (31 men and 66 women). The participants averaged 19.61 years of age ($SD=3.55$, range = 18-50). There were a total of 1608 daily observations. Although participants were requested to respond each day, most participants had incomplete responding, and completed on average 16.58 daily responses ($SD=9.36$, range = 4-40). Participants averaged 1.91 days between responses ($SD=1.17$ days), and the results of multilevel modeling showed that time between completed responses increased as the study progressed ($b=.01$, $p<.001$). In addition, participants’ response rate steadily decreased across the length of the study (Figure 8). Trait measures of self-concept clarity and grit were not significantly related to either total number of completed daily measures or the average time between completed responses.

Daily Diary Procedure

Surveys were collected electronically using the free Participation in Everyday Life (PIEL) Survey app for smartphones once per day for forty days (Jessup, Bian, Chen, & Bundy, 2012). The survey totaled 8 items and consisted of 3 self-concept clarity items and 5 grit items (see Appendix). The PIEL app outputted daily ratings on a continuous scale from 0 to 1 to two decimal digits. All of the items were reworded for a daily orientation, and anchored by “Strongly agree” and “Strongly disagree.” The survey took only a few minutes to complete, and item order was randomized.
The survey triggered a daily alarm at 6pm instructing participants to take the survey. The survey slider always reset itself to 0, rather than appearing at its previously set value. Participants had a window of 6 hours to answer the survey for that day, but were encouraged to complete the survey shortly once begun. After the window closed it was no longer possible to record a response for that day. The response window combined with the ability to timestamp survey initiation and completion prevented the undesirable issues of retrospective and prospective responding (Gunthert & Wenze, 2012).

Daily-Diary Measure

*Self-concept clarity.* Three self-concept clarity items were selected from the original self-concept clarity scale (SCC, Campbell et al., 1996) based on their established use in daily diary studies and representativeness of the construct (Nezlek & Plesko, 2001; Schwartz et al., 2011). The items measured clearness of self, belief conflict (reverse coded), and attitudinal conflict due to low self-awareness (reverse coded). A self-concept clarity summary variable was created using an average of these three items. The average alpha across the 40 days was .66.

*Grit.* Grit was measured by 5 items taken from the Short Grit Scale (GRIT-S, Duckworth & Quinn, 2009) for measuring consistency of interest and perseverance of effort. Two and three items measured consistency of interest and perseverance of effort, respectively. A grit summary variable was created using an average of these five items. The average alpha across the 40 days was .69.
RESULTS

Overview of Data Analytic Strategy

The data has a multilevel structure with daily observations nested in participants. These two levels correspond to two types of response variability in longitudinal data: within-subjects and between-subjects variability. Within-subjects variability is variability among the repeated-measures over time, such as changes over time for each subject. Between-subject variability is variation due to characteristics that are not measured over time, such as individual differences. Multilevel modeling was used for analysis of this data because it allows for accounting for both types of variability through the use of different types of predictors (Long, 2011). Predictors that change over time account for within-person variability, whereas predictors that do not change over time, but differ among participants, account for between-person variability. Multilevel modeling estimates fixed and random effects, which are the overall parameter estimates across the sample, and individual level deviations from those group estimates, respectively.

The hypothesis of daily mutual influence between grit and self-concept clarity can be tested using a multilevel cross-lagged structural equation model. Cross-lagged structural equation modeling is one of the most common longitudinal structural equation models (Figure 1). The cross-lagged model explains variable’s values as a function of its own earlier value (lagged effects) and the value of another variable (crossed effects). The lagged effects indicate the stability between adjacent occasions of measurement within each variable over time. The crossed effects show how much one variable at time $t_1$ predicts the other variable between times $t_1$ and $t_2$, controlling for the auto-regressive effect (Finkel, 1995; McArdle, 2009). The correlation of the
error terms represents covariation between the two variables not accounted for by the stability and crossed effects.

Intensively sampled data raises the possibility of modeling numerous stability and cross-lagged coefficients. Alternatively, a simplifying approach is to model fewer parameters by modeling stability and cross-lagged coefficients between adjacent occasions as equal (Rovine & Walls, 2006). An advantage of this approach is its parsimonious representation of the regularities across the complete range of the time series. In this approach a single set of autoregressive and cross-lagged parameters is estimated to represent the stability and crossed effects between all adjacent occasions of the data, rather than just a single pair of adjacent occasions.

To estimate the model, it is necessary to create lead variables shifted one day for daily self-concept clarity and grit. Table 1 illustrates how raw scores are shifted ahead one unit of time to create a lead score for an example time series. The lead variables are the dependent variables in the cross-lagged model, and regressing the lead variable (e.g., SCC\textsubscript{t+1}) on its corresponding raw variable (e.g., SCC\textsubscript{t}) yields the lagged/stability effect. Likewise, regressing the lead variable (e.g., SCC\textsubscript{t+1}) on another’s raw variable (e.g. grit\textsubscript{t}) yields the crossed effect. All analyses were performed in Mplus 7 with the full information robust maximum likelihood estimator (Muthén & Muthén, 1998-2012).

Associations of Daily Self-Concept Clarity and Grit

*Unconditional Model 1.* It is common in multilevel modeling to first estimate an unconditional random-intercept only model without predictors. The unconditional model permits calculation of the intraclass correlation (ICC). The ICC measures the proportion of variance that occurs between groups (in this case individuals) (Bickel, 2007), and so expresses the dependency between observations due to clustering. When clustering is substantial, as indicated by a high ICC, conventional OLS regression yields invalid inferential results with biased standard errors.
and incorrect degrees of freedom because its assumption of independence of observations is violated. Mixed modeling is an appropriate strategy for analyzing clustered data because it correctly partitions response variance into within-subjects and between-subjects portions (Long, 2012).

As expected from repeatedly sampled measurements, the ICCs for SCC and Grit were relatively high at .56 and .49, respectively, justifying the use of mixed modeling. Table 2 presents the results from Model 1. The average levels of SCC and Grit were .73 and .65, respectively, both \( p<.001 \). The random intercept variances of SCC and Grit were significant at \( \tau^2_0 = .032 \) and \( \tau^2_0 = .025 \), respectively, both \( p<.001 \), indicating that individuals varied by their mean levels. The correlation between random intercepts was also significant, \( r=.82, p<.001 \), showing SCC and grit mean levels are positively related within individuals.

**Conditional Model 2.** Next, predictors were added in Model 2 as crossed and lagged effects. Both fixed effects and random effects were estimated. The inclusion of random slopes permitted the modeling of individual differences in the strength and direction around the lagged and crossed fixed effects. Similarly, the inclusion of random intercepts permitted the modeling of individual differences in mean-level daily clarity and grit around the intercept fixed effects. All random effects were permitted to covary with one another.

Figure 2 and Table 3 present the results of Model 2. The crossed and lagged fixed effects were significant. Time 1 self-concept clarity positively predicted time 2 grit (\( B=.079, z=2.118, p=.034 \)), and time 1 grit positively predicted time 2 self-concept clarity (\( B=.135, z=2.997, p=.003 \)). The crossed effects signify the existence of reciprocal influences of daily self-concept clarity and grit, even after controlling for the significant lagged effects of self-concept clarity (\( B=.199, z=4.272, p<.001 \)) and grit (\( B=.229, z=5.162, p<.001 \)) on themselves. Next, to test whether clarity and grit differ in the strength of their influences on each other, the crossed effects
were constrained equal. The equality constraint did not significantly worsen model fit, $\chi(1)=1.62$, $p=.203$, signifying that the clarity and grit are equally influential on each other. The strength of the crossed and lagged effects varied across participants, as indicated by the significant random slope variances for the lagged effects of self-concept clarity ($\sigma^2_1=.069$, $z=3.353$, $p=.001$) and grit ($\sigma^2_1=.047$, $z=3.379$, $p=.001$), and the crossed effect of grit on later clarity ($\sigma^2_1=.041$, $z=2.067$, $p=.039$). Constraining the lagged and crossed fixed effects to zero significantly worsened model fit, $\chi(2)=38.28$, $p<.001$ and $\chi(2)=15.00$, $p<.001$, respectively, justifying their free estimation.

Table 4 presents the correlation matrix for Model 2’s random effects. All correlations between the random effects were nonsignificant, with the exception of the negative correlations between the random intercepts and the lagged effects random slopes, $r_{SCCintercept, SCCown}=-.59$, $p=.007$ and $r_{GRITintercept, GRITown}=-.90$, $p=.001$. These correlations are surprising, and elaborated in the discussion because they suggest high mean levels of self-concept clarity and grit are associated with lesser stability than lower mean levels. The random slopes variances were constrained to zero to test for the presence of individual differences. Constraining the own and coupling random slope variances to zero significantly worsened model fit, $\chi(2)=57.92$, $p<.001$ and $\chi(2)=41.06$, $p<.001$, respectively, justifying their inclusion.

One way of quantifying the proportion of variance explained in multilevel models is the summary statistic pseudo $R^2$. Pseudo $R^2$ is an alternative to the conventional summary statistic $R^2$, which is not designed for how multilevel models decompose total outcome variation into multiple variance components (Singer & Willett, 2003). Pseudo $R^2$ is the proportional reduction in residual variance between two models, and thus informs how much added predictors explain unexplained outcome variation. With its added predictors Model 2 improved upon the random intercepts-only Model 1 by reducing the residual variances of clarity and grit by 12% and 4% (pseudo $R^2$), respectively.
Conditional Model 3 with Level 2 Predictors. The fixed effects in Model 2 were the most important features for addressing the central hypothesis of the present study. The significant crossed effects, in particular, supported the hypothesized notion of day-to-day reciprocal effects between clarity and grit. Beyond these findings, Model 2 also yielded secondary results concerning random effects. Three of the four random slopes for own and coupling effects had significant variances, signifying that individuals deviate from the average estimates (fixed effects) for these parameters. On average across the whole sample, the clarity and grit own effects and the clarity on grit coupling effect were positive, as indicated by the positive fixed effects of Model 2. However, the significant random variances accompanying these fixed effects reveal there are individuals for whom these effects are negative (95% interval of clarity and grit own effects [−.32, .72] and [−.20, .66], respectively; clarity_t on grit_{t+1} coupling effect [−.26, .54]). There was also variation in individual’s mean levels of clarity and grit, as indicated by the significant variances for the random intercepts.

In Model 3 level two predictors (i.e., contextual, static variables) were added to possibly explain the individual differences in random slopes and intercepts found in Model 2. Trait level self-concept clarity and grit were entered into the model as level two predictors of the random effects. The random effects were the same as in Model 2, except for the random slope coupling of grit_t on clarity_{t+1}, which was removed to improve statistical efficiency because it did not have a significant variance in Model 2 (Long, 2012).

The results from Model 3 contained no significant effects for the level 2 predictors. These results suggest there is not enough evidence to reject the null hypotheses that trait clarity and grit do not moderate clarity or grit’s daily mean levels, lagged effects, or crossed effect. Trait self-concept clarity and grit were positively correlated, $r(95)=.59$, $p<.001$. 
Conditional Models 4/4b with Indirect Effects. It remains unknown the characteristic timescale(s) over which clarity and grit influence each another. Although Model 2 showed reciprocal effects of clarity and grit using a two-day process design, it is conceivable these variables unfold across other time scales making it worthwhile to consider alternative longitudinal models. To address this possibility, Model 4 (Figure 3) extends Model 2 by specifying a three-day process design. Model 4 allows for the testing of novel crossed effects, such as delayed direct effects (e.g., grit<sub>t</sub> on clarity<sub>t+2</sub>) and indirect effects (e.g., clarity<sub>t</sub> to clarity<sub>t+2</sub> via grit<sub>t+1</sub>). Model 4 omitted random slopes for simplicity, and only random intercepts were estimated for times 2 and 3 clarity and grit.

The results of Model 4 are shown unstandardized and standardized in Figures 4 and 5, respectively, and listed in Table 5. As before, there were significant crossed effects for both clarity and grit. Both clarity and grit had significant delayed crossed effects on each other two days later. Regarding next day crossed effects, grit predicted next day clarity, but clarity did not predict next day grit. The lagged effects of clarity and grit, which consisted of one-day and two-day autoregressive paths, were all significant.

Next, constraints were added to the model to compare lagged effects. The two next day lagged effects were constrained equal for clarity, and this did not significantly worsen model fit, \( \chi^2(1) = 2.26, p = .13 \). Performing the same equality constraint for grit also did not significantly worsen model fit, \( \chi^2(1) = 2.74, p = .10 \). These results signal that within clarity and grit next day lagged effects are equal, and are reassuring because the three-day lead structure is arbitrary and should not systematically alter clarity and grit’s autoregressive effects.

Constraints were then added to compare the crossed effects. The two nonsignificant crossed effects of clarity on next day grit were constrained to zero, and this did not significantly worsen model fit, \( \chi^2(2) = 2.03, p = .36 \). Performing an equality constraint on grit’s crossed effects on
next day clarity also did not significantly worsen model fit, $\chi(1)=.17, p=.68$. These null results suggest clarity’s next day crossed effects on grit both equal zero and that grit’s crossed effects on next day clarity are also equal, but significantly different from zero. A final equality constraint was placed on the delayed crossed effects of clarity and grit on the other two days later. This constraint did not worsen model fit, $\chi(1)=.01, p=.94$, and shows that the delayed reciprocal effects of clarity and grit on each other are equal.

Lastly, the two covariances of the residual errors between clarity$_t$ and grit$_t$, and clarity$_{t+2}$ and grit$_{t+2}$, were constrained equal. This constraint also did not significantly worsen model fit, $\chi(1)=.73, p=.39$, and is similarly reassuring because it suggests the association between clarity and grit does not change across the arbitrary lead structure.

The collective results from the constraints testing were then applied to Model 4 to yield a constrained reduced Model 4b. Figures 6 and 7 present its unstandardized and standardized estimates, respectively. Model 4b had excellent fit statistics (RMSEA: .009, CFI: .999, TLI: .998, SRMR within/between: .029/.014), and comparing it to the fuller freely estimated Model 4 did not significantly worsen model fit, $\chi(7)=12.36, p=.09$.

Next, indirect effects were tested with Model 4b. Because clarity did not have any significant next-day crossed effects on grit, there were no possible indirect effects of clarity on later grit. To recall, clarity’s only crossed effect on grit was a direct delayed crossed effect on grit two days later (see Figure 6). On the other hand, grit had significant next-day crossed effects on clarity. This raises the possibility of two indirect paths of grit to clarity two days later. One path is grit$_t$ to clarity$_{t+2}$ via clarity$_{t+1}$, and the other is grit$_t$ to clarity$_{t+2}$ via grit$_{t+1}$.

Multilevel structural equation modeling is recommended for testing mediation hypotheses with multilevel data (Preacher, Zyphur, & Zhang, 2010). The mediation hypotheses were tested using the 1-1-1 mediation multilevel structural equation model with fixed slopes.
syntax by Preacher, Zyphur, and Zhang (2010). The indirect effect through clarity_{t+1} was trending significant (B=.01, p=.078), however the indirect effect through grit_{t+1} was not (B=.01, p=.11). By contrast, using the ordinary ML estimator instead of MLR indicated these same indirect effects were significant, both p<.001. MLR and ML estimators generally provide similar results to the extent the data are normal, so any differences between the two reflect corrections for the data’s non-normality. The results of the mediation analysis provide partial evidence that grit continues to affect clarity even two days later depending upon the estimator used.
DISCUSSION

The purpose of the present study was to test whether daily self-concept clarity and grit reciprocally influence each other. The study employed a daily diary design across 40 days to record how these constructs fluctuate in the real-world contexts of participants’ personal lives, ongoing activities, and self-defined goals (see Reis, 2012). The results from multilevel cross-lagged panel modeling supported this notion by the findings of reciprocal effects of clarity and grit.

Crossed Effect of Self-Concept Clarity on Later Grit

Grit is what separates people who make little use of their personal resources from those who push themselves to their limits, and is why people differ in how much they accomplish, even if they have equal intelligence (Duckworth et al., 2007). Given its importance for predicting achievement, research has focused on understanding how grit works. For example, gritty people behave differently; they study longer and try harder, by exerting greater physiological engagement when persevering (Duckworth et al., 2007; Silvia, Eddington, Beaty, Nusbaum, & Kwapil, 2013). Gritty people have different motivations and meaning systems. People who approach happiness through engagement in attention-absorbing activities are grittier than people who approach it through meaningful activities, who in turn are grittier than people who approach it through pleasurable hedonic activities (Von Culin, Tsukayama, and Duckworth, 2014).

Similarly, Yeager et al. (2014) found schoolwork meaningfulness and having a self-transcendent purpose for learning predicted grit and gritty outcomes, respectively, in high-school students. Gritty people have differing goal structures. Moeller, Troop-Gordon, and Robinson (2015) assessed idiographic goal hierarchies and found that people with more differentiated hierarchies,
in terms of monotonically increasing intrinsic motivation, were grittier in response to daily interpersonal self-threats than were people with lesser differentiated goal hierarchies. The present study contributes to the grit literature another difference: gritty people have more certain self-concepts, and gritty behavior is bolstered by daily self-concept clarity.

Self-concept clarity bolsters core aspects of grit, such as focusing on a goal without abandoning it for alternate goals. This is because self-concept clarity signals the presence of consistent, well-organized self-knowledge. Clear self-knowledge underpins judgments of which goals to pursue, because it is an important guide for recognizing which goals will be self-verifying and authenticating (Setterlund & Niedenthal, 1993). Without which, Rosenberg (1989) stated, “a person has unclear, unstable, uncertain opinions, attitudes, and perceptions of himself – if he simply is not sure what he is like – then he is deprived of his most valuable frame of reference” (p.163). This explains why people with higher self-concept clarity are more likely to feel they lead meaningful, authentic lives (Boucher, Bloch, & Pelletier, 2016; Kraus, Chen, & Keltner, 2011; Shin, Steger, & Henry, 2016), and have personally-compelling careers (Treadgold, 1999). Gritty focus on a singular goal emerges from self-concept clarity, because clear self-knowledge enables commitment to identity-related goals (Johnson & Nozick, 2011; Schwartz et al., 2011), and regulates behavior more consistently than does unclear self-information (Burger & Guadagno, 2003; Guadagno & Burger, 2007).

Self-concept clarity also strengthens the second core aspect of grit: overcoming obstacles through perseverance. Perseverance benefits from intrinsic, identified, non-external, and non-introjected motivational styles, and self-determined regulation; all of which are associated with higher self-concept clarity (Kernis, Paradise, Whitaker, Wheatman, & Goldman, 2000). The importance of clear self-knowledge and identity guiding self-regulation is consistent with Duckworth’s advice to parents wishing to make their children more gritty that they may be more successful indirectly developing it by encouraging children to explore their own intrinsic
interests, than by instilling it directly (Scelfo, 2016). Perseverance may even be antithetical to the values of people with lower self-concept clarity because they also tend to have a diffuse-avoidant identity style, which is characterized by avoiding dealing with obstacles, procrastinating, and putting off decisions until they are situationally determined (Berzonsky, 1989; Johnson & Nozick, 2011). People with higher self-concept clarity may also better persevere because they can envision possible, self-expanding versions of themselves. Higher self-concept clarity presumably provides a stable sense of self from which to explore and broaden one’s attributes, because when people have self-uncertainty, they hedge their tenuous certainty by not self-expanding (e.g., embracing new hobbies, interests, taking on characteristics of others, etc.) (Emery, Walsh, & Slotter, 2014). This is important for perseverance because jobs that are self-expanding generate more commitment (McIntyre, Mattingly, Lewandowski Jr., & Simpson, 2014), and it seems likely that self-concept clarity, too, allows for the recognition of which jobs may be self-expanding.

In addition, self-concept clarity supports gritty perseverance through numerous other self-regulatory and emotional processes. For example, people with higher self-concept clarity are unlikely to deny or mentally disengage from a current or ongoing stressor (Smith, Wethington, & Zhan, 1996), and are likely to problem solve with others proactively and cooperatively (Bechtoldt, De Dreu, Nijstad, & Zapf, 2010). Perseverance inherently involves responding to failure, and people with higher self-concept clarity neither avoid self-threatening failures by self-handicapping (Thomas & Gadbois, 2007), nor do they become self-critical, self-destructive, or lose commitment when they occur (Johnson & Nozick, 2011); they are self-compassionate, which seems to confer similar benefits as having a growth mindset (Dweck, 2006). Emotional regulation, such as maintaining high levels of positivity and low levels of negativity, is also important for perseverance. From the outset, people with higher self-concept clarity are fortified by global reserves of positive self-views (i.e., self-esteem; Campbell, 1990), and while persevering feel higher levels of happiness, interest, and lower levels of tension, dejection, and
stress than people with lower self-concept clarity (Kernis et al., 2000). Reinstating a positive mindset after goal setbacks is also easier for people with higher self-concept clarity because their accessible and positive self-concepts facilitate self-affirmation (Bechtoldt, De Dreu, Nijstad, & Zapf, 2010).

Crossed Effect of Grit on Later Self-Concept Clarity

When Campbell et al. (1996) found clarity correlated with trait conscientiousness, they speculated clarity may relate to an internal locus of control and the ability to delay gratification. While grit has not been directly linked to either of these variables yet (c.f., Duckworth & Eskreis-Winkler, 2013; Duckworth et al., 2007) both of these qualities would seem to be recruited in the process of being gritty. Grittiness has even been equated with the delay of gratification when Mischel (2015, p.62) noted that how long a preschool kid waits during the Marshmallow test reveals how much grit the child has (c.f., Duckworth & Gross, 2014). As such, the present study provides evidence in support of Campbell et al.’s early speculation of a link between self-concept clarity and self-regulatory processes.

Campbell et al. also theorized that self-regulatory processes may be critical for clarity. For example, proactive (e.g., goal-directedness) and inhibitive (e.g., impulse restraint) self-regulatory processes may be implicated in developing and maintaining clarity. The present results also provided evidence for this second idea given that grit involves proactive and inhibitive self-regulatory processes. In particular, proactive goal-directedness and inhibitive impulse restraint align with grit’s facets of consistency of interest and perseverance of effort, respectively (Duckworth & Quinn, 2009).

The present study found grit had a positive effect on clarity, and inspection of the nonsignificant random effect variance revealed the effect was positive for all participants. This supports the idea that grit generally enhances clarity, but there may be circumstances in which
grit has a negative effect on clarity. An experiment by Burckley, Curtis, Burkley, and Hatvany (2015) showed that how goal-feedback affects clarity depends on goal fusion. Goal fusion describes how integrated the goal is to a person’s sense of self. When goal fusion is high, success and failure goal feedback correspond with increases and decreases in clarity, respectively. However, when goal fusion is low, success undermines clarity and failure strengthens it. These findings show that goal feedback (e.g., success or failure) increases clarity to the extent that it is self-verifying (Swann, Griffin, Predmore, & Gaines, 1987). This suggests that being gritty may lead to decreased clarity when the goal is non-self-verifying. An example of this is when goals are important but extrinsically motivated (Ryan & Deci, 2000), such as when a student pursues a career path only because of parental desire.

Self-concept clarity bridges the social-psychological and developmental approaches to self and identity research (Vignoles, Schwartz, & Luyckx, 2011). This is because self-concept clarity strongly resembles how Erikson (1968) envisioned personal identity; that is, the extent to which a person has adopted a clear and internally consistent set of goals, values, and beliefs (Schwartz et al., 2011). This similarity has motivated studies that link the two approaches by questions of how self-concept clarity relates to developmental processes underlying personal identity. For example, Schwartz et al. (2011) used a daily longitudinal design to assess relations between self-concept clarity and identity commitment in adolescents. They found self-concept clarity and identity commitments were reciprocally related using a cross-lagged panel model. Forming specific identity commitments (e.g., to one’s education) was associated with maintaining a clear sense of who one is, and inversely, having a clear sense of self enabled adolescents to more strongly commit to an identity. Using a longer time scale of five annual assessments, Schwartz, Klimstra, Luyckx, Hale III, and Meeus (2012) again found suggestive reciprocal relations between self-concept clarity and identity commitment in adolescents with a multivariate growth curve model. The present study contributes to this literature of the reciprocal relations
between self-concept clarity and identity development given the similarity between grit and identity commitment.

Commitment refers to the personal investment an individual has for a given identity (Marcia, 1966). Commitment is both a behavior and feeling, enacted through choices implementing that identity, and felt in the self-confidence given by those choices (Crocetti, Rubini, & Meeus, 2008; Crocetti, Schwartz, Fermani, & Meeus, 2010). Grit has never been compared with identity commitment, but it too reflects sustained personal investment in maintaining or achieving important personal values, beliefs, and goals. The types of behaviors that make someone gritty, such as maintaining consistency of interest and persevering against challenges, are behaviors that signal strong personal commitment. It seems then that grit may be evoked by an identity commitment, or be a behavioral process that develops identity commitment. From this perspective, the present findings suggest that self-concept clarity both drives and derives from identity commitment behaviors (i.e., staying focused on one’s goals, overcoming setbacks), and are similar to the reciprocal and symmetric effects between self-concept clarity and identity commitments found by Schwartz et al. (2011, 2012).

For those without strong identity commitments, the results suggest they may emerge by adopting a gritty orientation, such as sticking to one’s current path or being engaged in one’s roles. In other words, if one is uncertain about a new identity, taking small steps towards realizing it may strengthen one’s confidence and commitment in it (Kruglanski et al., 2000). That being said, grittiness on its own is not likely to be optimal for identity development. Gritty determination to a goal without strong personal investment is analogous to identity commitment without exploration, which leads to the foreclosed identity status (Kroger, 2007). Ideally, grit would co-occur with an intrinsically motivated identity commitment that was personally selected and strengthened through reconsideration, having explored alternatives (Crocetti, Rubini, & Meeus, 2008), and would be associated with an achieved identity status.
Lagged Effects of Daily Clarity and Grit

The results showed negative correlations between the random intercepts and the lagged effects for both daily self-concept clarity and grit. The lagged effect can be interpreted as the rank ordering stability of the observations (Selig & Little, 2012). This means individuals with higher mean levels of self-concept clarity and grit exhibited more daily shuffling compared to those with lower mean levels who tended to preserve and maintain their rank ordering across days. Why would individuals with high self-concept clarity, a clear sense of self, show greater daily instability than low self-concept clarity individuals? Similarly, why would gritty individuals, who are characterized by their ability to persevere across time, also show greater daily instability than non-gritty individuals?

It helps to consider the stability effect from a different perspective, namely change score modeling. In change score modeling a time \( t \) raw score predicts a change score instead of a time \( t+1 \) raw score. The change score is the difference between the two time raw scores (e.g., \( \text{time}_{t+1} - \text{time}_t \)). Change score models and auto-regression models (the lagged effects of Models 1 and 2) are equivalent modeling strategies which produce equal fits to the same dataset (McArdle, 2009). This is important because the stability coefficient in change score models links with dynamical systems notions of stability, in particular attractor strength. Stability in the change score model/dynamical systems logic refers to the strength of a variable’s homeostatic mechanisms; that is how quickly the variable restores its setpoint value (e.g., mean level) (Finkel, 1995). The more negative the stability coefficient in change score models, the stronger the feedback of a variable operating on itself over time (Butner, Gagnon, Geuss, Lessard, & Story, 2014). Importantly, the change score model’s lagged effect estimate is equal to the auto-regression’s lagged effect estimate minus 1 (Finkel, 1995). This means smaller stability effects in the auto-regression model (e.g., \( B = .164 \)) correspond to stronger attractors in the equivalent change score
With this understanding in mind, the seemingly unstable daily reshuffling in participants with high mean-levels of self-concept clarity and grit is actually the signature of a strong dynamically stable homeostatic tendency. For these individuals, the shuffling occurs because there is a strong tendency for them to maintain a constant (high) level of self-concept clarity and grit, regardless of yesterday’s relatively low or relatively high transient levels. These individuals are able to shrug off the effects of events causing low levels, and are likely to maintain high levels consistently. They have a strong attractor that reins them in to their characteristic level. Duckworth speaks to this phenomenon when she explains that gritty people are just as discouraged by setbacks as less gritty people, it’s just that they “up again two days later” (Scelfo, 2016).

Conversely, the seemingly stable rank ordering in participants with low mean-levels of self-concept clarity and grit is actually the result of weaker homeostatic tendencies (i.e., weaker clarity and grit attractors). These individuals are stable in the sense daily fluctuations persist for days, whether they are high or low. They are not able to reset to their characteristic level as quickly. If they were low the previous day, this carries forward the next day. Their clarity and grit levels are periodic, rather than consistent, with bouts of low self-understanding and low motivation, but also periods of relatively clear self views and dogged activity. As such their rank ordering is preserved across days only because it takes them longer to return to their characteristic level.

Limitations and Future Directions

The present study has several limitations. The daily measures of self-concept clarity and grit both relied on self-reports and are likely to relate, in part, simply because of common method
variance. Method variance depends on research context, and there are many sources which can either inflate or deflate observed relationships between constructs. The items were intermixed with random ordering, and while this practice has been recommended for reducing common method bias (Kline et al., 2000), it is difficult to tell whether it increases or decreases method bias. Intermixing may increase common method bias because participants have more difficulty distinguishing the constructs inflating the interconstruct correlation, but it also may decrease it because difficulty distinguishing can reduce reliability of the scales, which then reduces the interconstruct correlation (Podsakoff, MacKenzie, Lee, & Podsakoff). Another source is measurement context effects, such as measuring the predictor and criterion at the same point in time, location, or media. One solution to this is to separate the measurement of predictor of criterion temporally, which the present study did. Even though self-concept clarity and grit were measured concurrently at the same point in time, the longitudinal design allowed for modeling the criterion and predictor as separated by one day, while controlling for the concurrent covariation within the criterions and predictors. Still, future research would be strengthened by obtaining measures of self-concept clarity and grit from different sources, such as using behavioral measures, observer ratings, or actual performance markers as used in grit research (e.g., GPA, spelling bee rank).

The present study was observational, and though it met the criterion of temporal precedence for establishing causal claims, would require an experimental design to better understand the causal relationships between self-concept clarity and grit. An experimental design is especially warranted given the many potential mechanisms discussed that link self-concept clarity and grit. In particular, grit is conceptualized as the combination of two facets: consistency of interest and perseverance, so the question remains whether self-concept clarity enhances either one or both components, and if so, how.
Reversing the question is to ask how grit increases self-concept clarity. The self-concept clarity scale was originally theorized as an objective measure of self-concept structure, but Guerrettaz and Arkin (2016) argue self-concept clarity has both objective and subjective components. With this in mind, future research should identify whether grit enhances the actual organization of the self-concept, the subjective belief of self-certainty, or both.

Lastly, individual differences were found in both the reciprocal and stability effects. These variances remained unaccounted for by any of the measured person-level variables, so future research ought to investigate factors that amplify the feedback between self-concept clarity and grit.

Conclusion

Self-concept clarity and grit epitomize achievements of differing sorts: identity and goals. The present study used a longitudinal daily sampling design and was the first to provide evidence that achievements (or failures) in these distinct domains mutually enhance one another, such that fluctuations in self-knowledge trigger fluctuations in goal resolve, and vice versa. The results indicate the existence of reinforcing feedback loops between self-concept clarity and grit, and suggest the two are, in part, both causes and consequences of one another. Having a clearer sense of whom one is, such as one’s goals, values, and self-image galvanizes perseverance for one’s engagements. At the same time, making progress towards one’s goals and overcoming obstacles bolsters self-confidence and identity commitments. Future research will have to replicate the present findings, identify mediating mechanisms, and validate whether self-concept clarity and grit are tractable leverage points for interventions on the other (Meadows & Wright, 2008; Walton, 2014).
Table 1

Raw and lead score variables

<table>
<thead>
<tr>
<th>Day</th>
<th>Raw score&lt;sub&gt;t&lt;/sub&gt;</th>
<th>Lead score&lt;sub&gt;t+1&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.81</td>
<td>.91</td>
</tr>
<tr>
<td>2</td>
<td>.91</td>
<td>.83</td>
</tr>
<tr>
<td>3</td>
<td>.83</td>
<td>.75</td>
</tr>
<tr>
<td>4</td>
<td>.75</td>
<td>.67</td>
</tr>
<tr>
<td>5</td>
<td>.67</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 2

*Fixed and Random Effects of Model 1; Unconditional Random Intercept Model of SCC and Grit*

<table>
<thead>
<tr>
<th>Effect</th>
<th>Fixed</th>
<th>95% C.I.</th>
<th>Random</th>
<th>95% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC intercept</td>
<td>.734</td>
<td>.019</td>
<td>38.651***</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Grit intercept</td>
<td>.653</td>
<td>.017</td>
<td>38.461***</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>SCC residual</td>
<td>.025</td>
<td>.003</td>
<td>9.799***</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Grit residual</td>
<td>.025</td>
<td>.002</td>
<td>10.114***</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Note.* Degrees of freedom are not reported for the effects because Mplus employs z-tests which do not use degrees of freedom (Muthén, 2014). Estimates are unstandardized. *P*-values are two-tailed.
### Table 3

**Fixed and Random Effects of Model 2: Regressing SCC$_{t+1}$ and Grit$_{t+1}$ on SCC$_t$ and Grit$_t$**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Fixed</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Random</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC intercept</td>
<td>.485</td>
<td>.043</td>
<td>11.191***</td>
<td>&lt;.001</td>
<td>.400</td>
<td>.570</td>
<td>.051</td>
<td>.016</td>
<td>3.279***</td>
<td>.001</td>
</tr>
<tr>
<td>Grit intercept</td>
<td>.426</td>
<td>.037</td>
<td>11.482***</td>
<td>&lt;.001</td>
<td>.353</td>
<td>.499</td>
<td>.019</td>
<td>.008</td>
<td>2.527*</td>
<td>.012</td>
</tr>
<tr>
<td>SCC$_{own}$</td>
<td>.199</td>
<td>.047</td>
<td>4.272***</td>
<td>&lt;.001</td>
<td>.108</td>
<td>.291</td>
<td>.069</td>
<td>.021</td>
<td>3.353***</td>
<td>.001</td>
</tr>
<tr>
<td>Grit$_{own}$</td>
<td>.229</td>
<td>.044</td>
<td>5.162***</td>
<td>&lt;.001</td>
<td>.142</td>
<td>.316</td>
<td>.047</td>
<td>.014</td>
<td>3.379***</td>
<td>.001</td>
</tr>
<tr>
<td>SCC$_{coupl}$</td>
<td>.079</td>
<td>.037</td>
<td>2.118*</td>
<td>.034</td>
<td>.006</td>
<td>.152</td>
<td>.012</td>
<td>.009</td>
<td>1.317</td>
<td>.188</td>
</tr>
<tr>
<td>Grit$_{coupl}$</td>
<td>.135</td>
<td>.045</td>
<td>2.997**</td>
<td>.003</td>
<td>.047</td>
<td>.223</td>
<td>.041</td>
<td>.020</td>
<td>2.067*</td>
<td>.039</td>
</tr>
<tr>
<td>Cov(SCC, Grit$_t$)</td>
<td>.031</td>
<td>.003</td>
<td>9.112***</td>
<td>&lt;.001</td>
<td>.025</td>
<td>.038</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cov(SCC$<em>{intercept}$, Grit$</em>{intercept}$)</td>
<td>.016</td>
<td>.009</td>
<td>1.805</td>
<td>.071</td>
<td>-.001</td>
<td>.033</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCC residual</td>
<td>.022</td>
<td>.002</td>
<td>9.364***</td>
<td>&lt;.001</td>
<td>.018</td>
<td>.027</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grit residual</td>
<td>.024</td>
<td>.002</td>
<td>9.733***</td>
<td>&lt;.001</td>
<td>.019</td>
<td>.028</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cov(SCC$<em>{residual}$, Grit$</em>{residual}$)</td>
<td>.008</td>
<td>.001</td>
<td>5.786***</td>
<td>&lt;.001</td>
<td>.006</td>
<td>.011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** The estimates are unstandardized coefficients. Standardized coefficients are unavailable from Mplus for models with random effects because it is unclear how to standardize when the variance of the dependent variable varies over observations and there is not a single variance/covariance matrix (Muthén & Muthén, 2014). *P*-values are two-tailed: ***$p$ < .001, **$p$ < .01, *$p$ < .05.
Table 4

Correlation matrix of Model 2 random intercepts and slopes

<table>
<thead>
<tr>
<th></th>
<th>SCC_intercept</th>
<th>Grit_intercept</th>
<th>SCC_own</th>
<th>Grit_coupl</th>
<th>Grit_own</th>
<th>SCC_coupl</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCC_intercept</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grit_intercept</td>
<td>.51^*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCC_own</td>
<td>- .59***</td>
<td>-.30</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grit_coupl</td>
<td>-.42</td>
<td>-.47^*</td>
<td>-.30</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grit_own</td>
<td>-.37</td>
<td>-.90***</td>
<td>.32</td>
<td>.39</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SCC_coupl</td>
<td>.04</td>
<td>.01</td>
<td>.21</td>
<td>.32</td>
<td>.00</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note. P*-values are two-tailed: ***<.001, **<.01, *<.05, ^<.10.
Table 5

Fixed and Random Effects of Model 4: Three-day process model

<table>
<thead>
<tr>
<th>Effect</th>
<th>Fixed</th>
<th>95% C.I.</th>
<th>Random</th>
<th>95% C.I.</th>
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</thead>
<tbody>
<tr>
<td>SCC_{t+1} intercept</td>
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<td>.036</td>
<td>3.925</td>
<td>15.298***</td>
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<tr>
<td>Grit_{t+1} intercept</td>
<td>.514</td>
<td>.033</td>
<td>4.013</td>
<td>15.657***</td>
</tr>
<tr>
<td>SCC_{t+2} intercept</td>
<td>.562</td>
<td>.038</td>
<td>3.900</td>
<td>14.729***</td>
</tr>
<tr>
<td>Grit_{t+2} intercept</td>
<td>.517</td>
<td>.036</td>
<td>3.852</td>
<td>14.397***</td>
</tr>
<tr>
<td>SCC_{own1}</td>
<td>.160</td>
<td>.052</td>
<td>.228</td>
<td>3.064**</td>
</tr>
<tr>
<td>SCC_{own2}</td>
<td>.106</td>
<td>.050</td>
<td>.108</td>
<td>2.133*</td>
</tr>
<tr>
<td>SCC_{own3}</td>
<td>.143</td>
<td>.038</td>
<td>.209</td>
<td>3.766***</td>
</tr>
<tr>
<td>Grit_{own1}</td>
<td>.163</td>
<td>.033</td>
<td>.223</td>
<td>4.956***</td>
</tr>
<tr>
<td>Grit_{own2}</td>
<td>.109</td>
<td>.041</td>
<td>.110</td>
<td>2.698**</td>
</tr>
<tr>
<td>Grit_{own3}</td>
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<td>.029</td>
<td>.148</td>
<td>3.750***</td>
</tr>
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<td>Grit_{coupl1}</td>
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<td>.034</td>
<td>.060</td>
<td>1.224</td>
</tr>
<tr>
<td>Grit_{coupl2}</td>
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<td>.039</td>
<td>.859</td>
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<tr>
<td>Grit_{coupl3}</td>
<td>.054</td>
<td>.027</td>
<td>.079</td>
<td>1.999*</td>
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<tr>
<td>SCC_{coupl1}</td>
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<td>.035</td>
<td>.121</td>
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<tr>
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<td>.040</td>
<td>.077</td>
<td>1.904*</td>
</tr>
<tr>
<td>SCC_{coupl3}</td>
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<td>.028</td>
<td>.078</td>
<td>2.072*</td>
</tr>
<tr>
<td>Cov(SCC_{t}, Grit_{t})</td>
<td>.031</td>
<td>.003</td>
<td>.603</td>
<td>9.112***</td>
</tr>
<tr>
<td>Cov(SCC_{t+1}, Grit_{t+1})</td>
<td>.009</td>
<td>.001</td>
<td>.367</td>
<td>6.015***</td>
</tr>
<tr>
<td>Cov(SCC_{t+2}, Grit_{t+2})</td>
<td>.008</td>
<td>.002</td>
<td>.364</td>
<td>5.389***</td>
</tr>
<tr>
<td>SCC_{t+1} residual</td>
<td>.024</td>
<td>.002</td>
<td>.900</td>
<td>9.987***</td>
</tr>
<tr>
<td>Grit_{t+1} residual</td>
<td>.024</td>
<td>.002</td>
<td>.930</td>
<td>10.121***</td>
</tr>
<tr>
<td>SCC_{t+2} residual</td>
<td>.023</td>
<td>.003</td>
<td>.878</td>
<td>8.464</td>
</tr>
<tr>
<td>Grit_{t+2} residual</td>
<td>.024</td>
<td>.003</td>
<td>.924</td>
<td>9.386</td>
</tr>
</tbody>
</table>

Note. Est. and Std. Est. columns give unstandardized and standardized estimates, respectively. P-values are two-tailed: ***p<.001, **p<.01, *p<.05, 'p<.10.
Figure 1.

*Model 2 two day cross-lagged panel model of daily self-concept clarity and grit.*
Figure 2.

*Model 2 unstandardized estimates. P-values are two-tailed: ***p<.001, **p<.01, *p<.05.*
Figure 3.

*Model 4 three day cross-lagged panel model of daily self-concept clarity and grit.*
Model 4 freely estimated unstandardized estimates. P-values are two-tailed: ***p<.001, **p<.01, *p<.05, ˚p<.06.
Figure 5.

Model 4 freely estimated standardized estimates. *P*-values are two-tailed: ***, *p* < .001, **, *p* < .01, *p* < .05, *p* < .06.
Figure 6.

*Model 4b fully constrained with unstandardized estimates. P-values are two-tailed: ***p<.001, **p<.01, *p<.05.*
Figure 7.

Model 4b fully constrained with standardized estimates. P-values are two-tailed: ***$p<.001$, **$p<.01$, *$p<.05$,˚$p<.10$. 
Figure 8.

*Percentage of participants responding each day of the survey.*
APPENDIX OF DAILY DIARY MEASURES

Self-concept clarity (Campbell, 1996)

- “Today I had a clear picture of who and what I am” – Schwartz et al., 2011
- “Today my beliefs about myself conflicted with one another”
- “Today was hard for me to make up my mind about things because I don’t really know what I want”

Grit (Duckworth & Quinn, 2009)

- “Today I set a goal but later chose to pursue a different one” – consistency of interest
- “Today I had difficulty maintaining my focus on projects” – consistency of interest
- “Today I finished whatever I began” – perseverance of effort
- “Today setbacks didn’t discourage me” – perseverance of effort
- “Today I was diligent” – perseverance of effort
REFERENCES


