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Conscientiousness: A Structural Assessment and Development of the Facets of Control Scales

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Dedication

To Shane and Brooke

… And Buckley

ABSTRACT OF THE DISSERTATION

Conscientiousness: A Structural Assessment and Development of the Facets of Control Scales

by

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Through a series of four studies, this research addresses two specific questions: what is the most accurate facet structure of Conscientiousness and, given that previous research indicates self-control should most likely be considered a facet of the trait, can a measure be created that captures a multidimensional assessment of self-control? Data were collected from a total of 827 undergraduate students at the University of California, Riverside as well as 299 community participants who completed an online survey that measured aspects of their personalities. While this dissertation relied heavily on established Big Five personality inventories, measures of constructs similar to Conscientiousness, including Grit and Determination, were also included. Until now, these were infrequently tested within the Big Five framework. Finally, a new Facets of Control measure is created, refined and tested against established scales. Exploratory factor analytic methods revealed a facet structure of Conscientiousness that included a proactive aspect defined by Grit, Determination, Industriousness and Productiveness.

Models also revealed a robust and consistent facet of Order and Organization in all four studies. Finally, an inhibitory aspect of the trait was identified which was captured by Self-Control measures from the Chernyshenko Conscientiousness Scales, Prudence from the HEXACO and Impulse Control from the Facets of Control measure. This specific aspect of the new scale proved useful in establishing the importance of not only adding an inhibitory feature to the understanding of Conscientiousness, but also making a compelling case for including Self-Control within the larger Five Factor Model framework of personality.

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Personality research is focused on explaining the whole person consisting of their emotions, thoughts and behaviors (Funder, 2019). It is possible to view the entire field of Personality psychology as an attempt to quantify humanness for understanding, explanatory and predictive purposes. As Jack Block (Block, 2002) suggested, the entire point of personality may be as an affective processing system to help people navigate their complex social environments. As it is currently comprised, the trait perspective of personality includes five distinct factors. They are known as Extraversion, Agreeableness, Neuroticism, Openness and Conscientiousness.

In the BFI-2 (Soto & John, 2017), Extraversion measures the degree to which one is sociable, assertive as well as their energy level. Agreeableness is captured by one's compassion, respectfulness and trustworthiness. Neuroticism is measured by anxiety, depression and emotional volatility though it is important to note that these terms usually refer to the sub clinical trait of a person rather than a diagnosable disorder. Openness is measured by intellectual curiosity, aesthetic sensitivity and creative imagination but is also often associated with intelligence and culture, making it one of the less replicable traits (Soto & John, 2017).

Conscientiousness, the striving aspect of humanness, may be captured most effectively by individual differences in how people express their motivations and pursue their goals. The BFI-2 suggest the trait is best captured by measuring these individual differences in organization, productiveness and responsibility (Soto & John, 2017). The purpose of this dissertation is to potentially offer compelling reasons to re-consider this conclusion by assessing the factor structure of Conscientiousness. The intention here is to

make progress towards a more complete understanding of the trait and its measurement through the evaluation of Big-Five development, consideration of related constructs and a review of the current literature on Self-Control.

Development of the Big Five

The Big Five model of traits is one of the most robust and enduring findings in Personality science. This intention to describe and classify personality traits and types can be traced to ancient Roman philosophers who used terms like sanguine and phlegmatic to describe personality (Ekstrand, 2015). Modern trait and type research from multiple disciplines and perspectives tend to commonly find five broad traits of personality which have now persisted for decades (Digman, 1990). The stability of five factor structure findings across research approaches is a central reason personality science is so enduring. Contributions from lexical analysis, finding structure in nearly 18,000 personality descriptive words in the English language (Goldberg, 1981), as well as empirical investigations which found structure in widely used inventories like the Minnesota Multiphasic Personality Inventory (Costa & McCrae, 1994), and self-report (Soto & John, 2016) data collection methods, provide the structural continuity across a wide array of personality psychology labs spanning decades of research and untold numbers of participants. This offers striking validity to the underlying structure of the five-factor model of personality.

Initial discussions about the development of personality data that included Conscientiousness center on Raymond Cattell and his 16PF studies (Cattell, 1947). Cattell argued for many more than just five traits. His expanded list included traits like

warmth, reasoning, dominance, rule-consciousness, sensitivity, privateness and tension, to name a few. Similar to Allport (Allport & Odbert, 1936), Cattell was interested in a lexical approach to personality assessment, reducing the list of potential trait words to about 170. Rather than asking if a trait was present or not present in an individual, Cattell's work graded each trait on a continuum. This is the method currently used in the assessment of the Big Five. While his work was ultimately shown to include analytical flaws (Digman & Takemoto-Chock, 1981), it nonetheless offered a groundbreaking assessment of personality (Cattell, 1946, Cattell 1947).

Perhaps the earliest modern work which combined and analyzed data from multiple sources of personality rating was done by Fiske (1949). The work by Fiske combined self, peer and clinician assessment of personality traits for 122 participants who lived together and were studied over a one week period. Not only did this work begin to lay the foundation for a five factor model during an era when the number of traits were in considerable debate after the work of Cattell, but it also showed that self versus other reporting was closely related. While not perfect, self and other ratings tend to show marked similarities across the five distinct traits. Fiske concluded that the five factors were Social Adaptability, Emotional Control, Conformity, Inquiring Intellect and Confident Self-Expression.

Tupes and Christal (1961) continued the advancement of the five factor model. They factor analyzed eight different samples based on Cattell's 16PF and consistently found stability in five factors. They pointed out perhaps the most pressing issue holding back more expansive acceptance of the five factor model at the time was "disagreement

among analysts as to factor titles" (Tupes & Christal, 1961). They ultimately settled on Surgency, Agreeableness, Dependability, Emotional Stability and Culture as their factors.

Norman (1963) utilized a peer nomination rating scale which also resulted in five factors. His findings aligned with Tupes and Christal (1961) on Agreeableness, Emotional Stability, Culture and Surgency, though he did offer Extraversion as an alternative name for Surgency. Norman also added Conscientiousness rather than Dependability. Norman (1963) became, perhaps, the initial adopter of the term Conscientiousness to characterize this third factor of Personality in his review of work by Cattell. Previously offered but notable in Norman's discussion, is the orthogonal nature of personality traits. While there is great replicability in the factors themselves, there is also strong evidence that each of the five factors are largely unrelated to each other.

Peabody (1967) presented additional support for a model of personality that included three distinct traits in which he equated Extraversion to Assertive vs Unassertive, Agreeableness to Evaluation and Conscientiousness to Impulse Expression. His work elucidated the difference between evaluative, how a person is judged based on something similar to likability for example, and descriptive, what a personality adjective actually means, judgements in personality inference. While this line of research did not make conclusions about trait Openness and few conclusions about Emotional Stability, there was clear evidence of Extraversion, Agreeableness and Conscientiousness. Importantly for this dissertation, one of the strongest loading dimensions was the adjective pair Self-Control and Impulsivity (Peabody, 1967).

As is clear, even in the early development of personality research, the trait structure of the Big Five has been revised numerous times. While more modern reviews exist, perhaps the most compelling and enduring review is that of Digman (1990). Digman's work evaluates much of what has been explored here. Ultimately, Digman's work finds a similar conclusion that time and again, from many different approaches and samples, five factors of personality emerge.

While their contributions are more closely examined in subsequent sections of this dissertation, no summary of the development of the Big Five is complete without acknowledging Goldberg (1992) as well as Costa and McCrae (Costa & McCrae, 1992). According to the assessment presented in a review chapter (John et al., 2008), Goldberg should not only be credited with using the Big Five phrasing (Goldberg, 1981) but also for the intentional focus on lexical terminology most unique to each trait rather than trying to find the trait words which marked the margins (Chaplin et al., 1988).

The contributions of Costa and McCrae and their NEO-PI-R (Costa & McCrae, 1992) were important for several reasons. First, they confirmed the five factor model which is in use today: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness. Second, this finding, which was closely aligned with Goldberg's work, was developed with questionnaire items rather than trait adjectives. Finally, their work came from a community sample which was different than the college samples in Goldberg's work yet arrived at the same conclusion (John et al., 2008). While each of these traits offers intriguing insights into the thoughts, feelings and behaviors of

individuals, of greatest interest for this project is the history and development of the trait Conscientiousness.

The Structure of Conscientiousness

This focus on trait Conscientiousness, often the third most prominent personality trait factor after Extraversion and Neuroticism, is largely due to its association with individual differences in how people express their motivations, goals, achievement desires as well as a multitude of important life outcomes (Ozer & Benet-Martinez, 2006). Currently, Conscientiousness is defined as an "individual difference in the propensity to follow socially prescribed norms for impulse control, to be task- and goal-directed, to be planful, delay gratification, and follow norms and rules." (Roberts et al., 2014) This is mirrored closely by a second definition that Conscientiousness is "socially prescribed impulse control that facilitates task and goal directed behavior, such as thinking before acting, delaying gratification, following norms and rules and planning, organizing and prioritizing tasks." (John et al., 2008). There is substantial evidence that Conscientiousness facets include proactive elements (productivity, industriousness), a facet of Order and Organization, and inhibitory elements which require further investigation (Milyavskaya et al., 2019).

The proactive aspects of Conscientiousness measure differences in the way people seek to work. The widely used personality scale, the BFI-2, includes a facet of productiveness which is defined as "work ethic and persistence while pursuing goals" (Soto & John, 2017). Similarly, two other scales, the HEXACO and Chernyshenko Conscientiousness Scale capture this difference with measures of Diligence and

Industriousness which have similar definitions. Conscientiousness also seems to be defined by an Order/Organization facet, again defined in the BFI-2 as "preference for order and structure" (Soto & John, 2017). Put simply, people differ in how much they seek, require and internalize ordered thinking and behavior. What is less well defined yet logically vital to goal pursuit is inhibitory aspects of personality, namely self-control. Established measures either broadly include items related to self-control or include somewhat peripheral facets like Responsibility in the BFI-2 defined as "commitment to meeting duties and obligations" which is more closely related to pro sociality than inhibitory self-control (Soto & John, 2017). Variations in these dimensions are related directly to what goals people pursue and how they pursue them.

As will be accomplished here, a review of this current literature reveals an open and promising opportunity to revise the facet structure of Conscientiousness especially the inhibitory facet. The inhibitory dimension is currently captured by the BFI-2 facets of responsibility (Soto & John, 2017), the HEXCO facet of prudence (Lee & Ashton, 2018), and broadly by rudimentary self-control items associated with various other personality measures. The origins and significant turning points that led to the current understanding of Conscientiousness are reviewed in this work, which make clear the need for empirical assessment into the positioning of Self-Control within the Big Five framework. While analysis and review of the most pivotal studies on personality that include conceptions of Conscientiousness are included, works that evaluate data from multiple studies with multiple sources appear to be of most value.

In more modern studies, Conscientiousness continues to be associated with academic and professional achievement (Ozer & Benet-Martinez, 2006). From the time of Norman's contributions on, some variant of Conscientiousness has been present in the research. Goldberg (1981) and his lexical approach also concluded that the third personality trait should be labeled Conscientiousness. As will be revisited, one group of researchers dubbed this third trait the "Will to Achieve" (Digman & Takemoto-Chock, 1981). It seems their intention was to capture the largely proactive dimension of Conscientiousness which informs a significant portion of the current research. Costa & McCrae (1985) and Lee & Ashton (2004) also concluded that the third trait should be labeled Conscientiousness, though the latter began to question if this was too broad by extracting an honesty/humility dimension. Work by Roberts and colleagues has combined many of the established personality scales to identify common trends which resulted in the Chernyshenko Conscientiousness Scale (Green et al., 2016). However, given that Roberts revealed a distinct facet of self-control, combined with the Digman (1981) work, it is argued in this dissertation that further investigations should be made into the inhibitory aspect of Conscientiousness, self-control, and evaluate its role within the personality trait domain. There are constructs more closely related to the traditional structure of Conscientiousness to consider as well.

Related Constructs - Grit

The construct of Grit and its relationship to Conscientiousness is also assessed within this project as work by Duckworth (2007) resulted in a Grit scale which was largely developed independent of established personality research. This resulted in an

early form of the measure which predicted success in first year cadets at West Point, students at the University of Pennsylvania, and National Spelling Bee participants above and beyond Big Five Conscientiousness (Duckworth et al., 2007). Duckworth later refined the measure to a short form with 8 questions and found similarly predictive results that explained variance in individual differences beyond Conscientiousness (Duckworth & Quinn, 2009). A third study operationalized the concept of Grit in retention and effectiveness ratings of first year teachers by applying the two proposed facets of Grit: Perseverance of Effort and Consistency of Interest (Robertson-Kraft & Duckworth, 2014).

Duckworth's work found that Grit offered remarkable predictive capacities in an array of studies (Eskreis-Winkler et al., 2014, Robertson-Kraft & Duckworth, 2014, Duckworth et al., 2011). This may have been a benefit of publishing conclusions without first testing the measure within available and established personality frameworks. A considerable number of studies that followed Duckworth's original papers in 2007 and 2009 failed to find the same conclusions with one research group concluding that Grit was simply an extremely efficient self-report measure of Conscientiousness (Crede et al., 2017). Most recently however, Duckworth has begun to publish work that includes Grit as a facet of Conscientiousness (Duckworth et al., 2019). This will be tested here as other researchers are also beginning to find that Grit might be best understood as a facet of Conscientiousness.

Current Established Measures

The facets of Conscientiousness from the most current and commonly used personality measures in research today are listed in Table 1. Table 1 includes a list of the facets which appear in three or more of the established scales and from subsequent studies that combined multiple assessments into the work. All studies reviewed for this dissertation contained a facet of Order associated with Conscientiousness, which is the logic behind listing it first in the table. Industriousness or some form of it, like productiveness, ranks second in the most commonly identified facets.

Table 1

List of Facets Associated with Current Personality Measures

Measure	Order	Industriousness	Self-Control	Responsibility
NEO/IPIP	Order	Deliberation	Self-Discipline	
HEXACO	Organization	Diligence		
BFI-2	Organization	Productiveness		Responsibility
Select Multi Measure Assessment Studies				
Perugini (1997)	Meticulousness		Recklessness	
Peabody (2002)	Orderliness	Work/Persistence	Impulse Control	Responsibility
Roberts (2004)	Orderliness	Industriousness	Impulse Control	
Roberts (2004)	Order	Industriousness	Self-Control	Responsibility
Duckworth (2009)	Tidiness	Perseverance	Cautiousness	
Schwaba (2020)	Organization	Achievement	Self-Discipline	

Note: Roberts (2004) in bold resulted in Chernyshenko Conscientiousness Scales

The NEO-PI-3 (McCrae et al., 2005) as well as the closely associated IPIP-NEO (Goldberg et al., 2006) have, by design, a nearly identical trait and facet structures. The IPIP was designed as a free version of the NEO-PI-3 and is the only measure which includes a self-control facet, even though the items are exceedingly broad. Examples of

these broad items include “am always prepared”, “get to work at once” and reverse keyed items like “waste my time” and “postpone decisions” (Goldberg et al., 2006). Combined, the IPIP and NEO have close to 18,000 citations at the time of writing this paper demonstrating how widely these measures are used in research. The HEXACO (Lee & Ashton, 2018) diverges slightly from the five factor model to include a sixth trait of honesty/humility, while still including an order and diligence facet of Conscientiousness. There is no direct connection to Self-Control at all within this measure. The HEXACO has over 1500 citations within the current literature yet completely lacks a facet associated with inhibition. Finally, the BFI-2 (Soto & John, 2017) contains three facets of Conscientiousness (organization, productiveness and responsibility) and over 5000 citations, yet no direct measurement of Self-Control.

What is most remarkable about this table is the subsequent studies aimed at analyzing trait structure and the facets they produce when combining various established measures. The Perugini study was a lexical analysis that included 122 adjectives and using principal components analysis, identified reliability and meticulousness as the two main facets of Conscientiousness (Perugini & Gallucci, 1997). The Peabody study expanded lexical analysis in six new languages and found impulse control, responsibleness, orderliness, and work to be the facets of Conscientiousness (Peabody & De Raad, 2002). Roberts published two studies specifically on the facets of Conscientiousness in 2004, one of which led to the development of a new scale (Roberts et al., 2004), the Chernyshenko Conscientiousness scale. The Chernyshenko Conscientiousness scale is a six-facet measure of strictly Conscientiousness. It is

important to note that these were the first studies that not only identified a facet of self-control but then developed a specific instrument which included Self-Control. The Duckworth study (MacCann et al., 2009) focused on high school students and included the IPIP, BFI and teacher ratings of students and argues for an 8 facet model of Conscientiousness.

Lastly, the Schwaba article is a remarkable network analysis of personality facets across a wide array of measures (Schwaba et al., 2020). This work identifies the most closely related facets to each of the Big Five dimensions. In order, the top six, out of 70 included facets, most closely associated with Conscientiousness in this work are Mastery from the HPI (Hogan & Hogan, 1992), Conscientiousness from the AB5C (Hofstee et al., 1992), Discipline from the BFI (Soto & John, 2009), Achievement Striving from the NEO (Costa &McCrae, 1992), Purposefulness again from the AB5C and Organization from the JPI (Jackson, 1994). The important conclusion is that established measures woefully underrepresent Self-Control though nearly all make some sort of connection to inhibitory processes. All studies aimed at improving the understanding of the facet structure of Conscientiousness, the selection listed in Table 1, identify Self-Control as an integral piece of the personality puzzle.

Current Research on Self-Control

The strongest case for a connection between Conscientiousness and Self-Control is the common association with successful goal pursuit, often measured in the academic arena (Werner et al., 2019). Increased Conscientiousness, much like increased Self-Control, is regularly linked to a similar amount of increase in goal related achievement.

More recently, research has been conducted which demonstrates that Self-Control should be a facet of Conscientiousness (Roberts et al., 2014). The gap in the literature seems to be giving closer consideration to Self-Control scales for potential opportunities for improvement. Finally, there is reason for making a compelling case about where a more accurate measure of Self-Control should be situated within the Conscientiousness framework. The first step is to appreciate that Self-Control is not a blanket concept or mechanism and to begin to parse apart the subtleties of the trait.

Current research distinguishes between effortful self-control, impulse control, and impulse awareness (Milyavskaya et al., 2019). Effortful self-control can be understood as underlying the virtuous, good and responsible actions that one makes (Milyavskaya & Inzlicht, 2017). Impulse control is how one experiences situations when multiple and often competing or conflicting impulses occurring simultaneously (Tangney et al., 2004). Finally, impulse awareness is simply the distinction between whether a distracting impulse, either internal or external, entered one's conscious awareness (Brownstein, 2018). The first two features of self-control have received ample study and a number of self-report measures exist to identify individual differences (Tangney et al., 2004). With this dissertation, an attempt is made to create a new scale that measures differences in this multidimensional Self-Control which is called the Facets of Control (FoC) scale. Information gained with the FoC scale shed light on differences in Goal Focus, Undistractibility and Impulse Control. Within a personality science framework, and with considerable caution not to stray into the work of Cognitive Psychologists who view

impulse control much differently, this scale is intended to measure differences in how a representative selection of behaviors might be impacted by distracting impulses.

This dissertation stems from both psychoanalysis, in which competing impulses are the source of all behavior (Brenner, 1974), to bio physiology, identifying neural activations in responses to environmental stimuli (Milyavskaya et al., 2019). There are a staggering number of impulses that constantly occur within a person's environment. How many of these impulses rise to the level of conscious awareness? Are there individual differences in the strength of the impulse required to rise to that level of conscious awareness? These questions are largely constrained to the domains of goals and achievement and the trait of Conscientiousness for this project. This is a non-trivial distinction from various other lines of research that focus on diet and food choices or sex and relationships. In doing so, this work determines if individual differences in the threshold to experience distracting impulses should be considered a facet of Conscientiousness, perhaps contributing to the understanding of why Conscientious individuals so often exhibit academic and professional achievement.

The Present Study

This study offers a unique opportunity to capitalize on the significant work done by past and present researchers to improve the understanding of the structure of Conscientiousness. Ultimately, the five factor model is not an exhaustive list of personality traits, describing all of personality. Rather, the five factors represent the highest, global level of personality (John et al., 2008). With so much evidence of stability at the global level, work can be done to solidify the facet structure of the traits. The aim

of this study is to do just that with trait Conscientiousness by incorporating established personality measures, peripheral measures developed independently of the established scales and a new measure designed to identify trait facets not yet captured adequately in current research.

It is clear that the Proactive and Order facets of Conscientiousness are well studied and measured. There is little evidence to suggest these facets require grand re-adjustment. However, the total absence of self-control is highly suspect. When considering the established structures, related constructs, current measures and research as well the calls for a more nuanced consideration of Self-Control, an opportunity to address three research questions emerges.

The three main research questions presented and addressed here are:

RQ_1: Can a measure be designed which identifies multidimensional rather than unidimensional Self-Control?

RQ_2: If so, when combined with established personality measures, can a clearer picture of the structure of Conscientiousness be established?

RQ_3: How should Grit be situated within the structure of Conscientiousness?

Methods

Four studies are described in this dissertation with two parallel objectives. The first is to refine the list of items associated with the FoC scale and the second is to collect data with frequently used, established measures to better assess the structure of Conscientiousness. Three of the studies include data collected from University of California, Riverside undergraduates and a fourth study includes data from a community

sample, collected with the online participant access platform, Prolific. Exploratory factor analytic methods are used to analyze data throughout.

Participants

Data were collected from a total of 847 University of California, Riverside undergraduates and 299 community participants totaling 1,126 individuals. More detailed information regarding individual study demographics are included with each study. The intention was to gather information from a diverse sample. The undergraduates were readily accessible with little associated cost, but this is often a pitfall in survey data collection research. Just because a sample is accessible does not make information gained from testing that sample terribly useful and trustworthy on its own. This is why the fourth study was conducted and data were collected from the community sample using the online data collection resource, Prolific. The undergraduate sample offered a chance to generate and refine items, measures and processes and the community sample offered a chance to confirm and test the basic generalization of the findings.

Data Integrity

In these data sets, attention checks were dispersed within the surveys to identify careless, inconsistent, and random responding. These attention checks consisted of pairs items, one from an established measure and an added mirror question worded in the opposite direction. Items were chosen with caution as some of the options, when reversed, had the potential to be somewhat off-putting for participants, like rating themselves on the item “I am not a hard worker” which was the mirror of “I am a hard worker” from the Grit-S measure. All efforts were made to avoid questions that might

cause a negative implicit interpretation. An example of an item pair included in the measure is “It is rare for me to lose interest in the major goals I have set for myself.” and “I sometimes lose interest in the major goals I have set for myself.” In theory, a participant carefully responding, would choose precisely opposite Likert scores on each item which creates differences scores for evaluation. There were several steps involved in identifying careless responders.

First, a flagging system was established. In this case, if both responses on the mirrored items were on the same side of the middle response, a 1 was given to the score identifying poor attentional responding. For instance, on a 7 point scale, if the participant responded with a 6 to the established measure item and a 5 to the reverse worded item, both scores are on the same side of the middle score of 4. This would suggest careless responding. Conversely, if the responses were at or on opposite sides of the middle score, a 0 was given which indicated that the participant was most likely paying attention to their responses. This series of flags, all the instances were a participant earned a 1, were summed and scaled. The intention was to generate a rigorous system of identifying poor attention by participants to ensure any participants set aside were done so accurately.

Ultimately, the flagging system was implemented as the approach successfully generated clear thresholds for setting participants aside. Respondents were required to pass one more than half of the flagged attention checks in order to remain in the analysis. This method generally only identified participants who’s summed attention check score exceeded three standard deviations above the mean. This threshold was universally applied to all data sets. This method was also effective as it allowed for individual

interpretation of the questions, expecting that some participants may experience unintended implicit meaning in mirrored questions. This liberal yet clear cut approach to setting aside participants proved prudent and effective.

Additionally, data were evaluated further for careless responding by identifying long stringing which is an index of a participant choosing the same response consecutively over a long stretch of items. Total survey lengths ranged from 187 to 234 items across the data sets and a threshold of 50 consecutive identical answers in a row was established as a maximum careless responding threshold. Long stringing of 50 responses, or more, was greater than 3 standard deviations above the mean compared to all participants, establishing it as a clear and universally applicable threshold for setting aside participants.

Lastly, a simple question was asked of participants: “Should we trust your responses?” It was made clear that course credit for undergraduates or financial compensation for community participants would not be effected by answering this item honestly. In studies 1, 2 and 3, between 1% and 6% of respondents in each data set chose the option that their data should not be trusted and were set aside from analysis. In study 4, which included the Prolific participants, no one chose this option. Table 2 below displays the participants who were ultimately set aside and not included in analyses.

Table 2

Participants Set Aside

	Initial N	Trust	Attention	Final N
Study 1	278	6	7	265
Study 2	363	7	8	348
Study 3	245	16	15	214
Study 4	301	0	2	299

Planned Analyses

All data analysis was conducted using R and RStudio (RStudio Team, 2021). Missingness was addressed in the data using the Mice function in R (Van Buuren & Groothuis-Oudshoorn, 2011). Predictive mean matching methodology for missingness was employed as it allowed some identifiable benefits. This process identifies the most similar complete participants to the participant with missing data and predicts the missing values based on the most similar set of complete values. By relying on real values from similar participants rather than purely theoretical computations, the robustness of the generated results is more likely. No data set had more than 80 total missing values, spread across the entire dataset, constituting around .1% total missingness.

The core statistical analysis methodology employed for this project was exploratory factor analysis. Exploratory factor analysis is used to identify the underlying structure of a set of variables or items. The method does so by evaluating correlations between items and facets within the data set and condensing them into a smaller set of latent factors (Revelle, 2021). In this case, it was used on the new measure, the FoC, to identify the underlying structure as well as identify items that needed to be re-written or removed. It was also used at the item level on the BFI-2 data as a data integrity check, ensuring that these data shared a structure with the structure suggested by BFI-2 researchers (Soto & John, 2017). Exploratory factor analysis was also used to model new structures of the BFI-2 after including facets from the FoC and to model the total structure of Conscientiousness.

One of the most important aspects of exploratory factor analysis is identifying the proper number of factors for aligning items and facets. Eigenvalues and associated scree plots were used to establish the proper number of factors for this project. First, the actual eigenvalues themselves were less important to decision making than the change between sequential eigenvalues. Second, parallel analysis was employed to compare differences between expected vs observed eigenvalues. This offered an additional perspective for each data set to consider beyond the eigenvalue change. Finally, the RMSEA was incorporated into justifying the number of factors. RMSEA or root mean square error of approximation, is an indication of model fit between the observed and model-based estimates of the data. These three criteria of eigenvalues and fit indices informed the decisions about all EFA models.

When considering how many items to include with each factor, a lower limit threshold of .40 was selected for factor loadings strength. Items that fell below .40 rotated factor loadings were not considered to meaningfully explain the latent variable. Items and facets were also evaluated for factor loadings on all factors. Ideally, an item or facet loads strongly onto one factor and remains orthogonal to the remaining factors, though this is sometimes not the case for loadings near the .40 threshold. Items and facets that fell just below the .40 threshold were considered for inclusion if their loadings were near zero on remaining factors though this was extremely rare. For the vast majority of cases, the .40 threshold was strictly relied upon.

Oblimin rotation was selected for the factor rotation method for the main reason that it allows factors to be non-orthogonal. Unlike varimax rotation which only returns

orthogonal factors, oblimin was far more useful for these personality measures which were expected to have some empirical factor overlap. For instance, the FoC was written to include multiple facets that measure individual differences in self and impulse control. Given the inevitability of overlap between them, varimax rotation was ruled out. In addition, maximum likelihood modelling was employed as preliminary tests suggested the data were normally distributed. This also allowed for ample goodness of fit indicators.

General Studies Introduction

The series of studies conducted for this project were designed to test three research questions. The first asks if a self-report survey can be generated to identify multidimensional aspects of self-control rather than treating self-control as an umbrella term meant to catch anything related to inhibition. The second question asks whether, with this new information about self-control, will a new structure of Conscientiousness be producible and replicable. Finally, where does Grit fit within the established and evolving personality framework. These studies were designed to thoroughly answer as these questions.

Included Measures

Facets of Control

Central to the contribution made by this dissertation is the Facets of Control scale. As carefully described in the introduction and literature review, the body of knowledge is missing a more multidimensional assessment of Self-Control. Measures that include facets of Self-Control, like the Chernyshenko Conscientiousness scale, or even dedicated

self-control measures, like the Self-Control Behavior Inventory (Tangney et al., 2004), address the trait from a general, omnibus perspective. These scales tend to focus on self-control associated behaviors like "I eat healthy foods" or "I spend too much money" which seems to miss the concept of dealing with the underlying impulses. The intention of creating this measure was to ask questions more specific to different aspects of impulse during goal pursuit. An initial offering was included in the first study with two rounds of revised items lists in the subsequent three rounds of data collection. Further discussion of the items, revisions and final versions of the measure are discussed in further detail in the analysis of each study below.

Experiences in Close Relationships Revised

The ECRR was included in the first study of this dissertation only. There was early interest in testing whether there was a difference in attachment styles associated with Conscientiousness and goal pursuit. The ECRR was included because it measures attachment styles of Avoidance and Anxiety (Fraley et al., 2000). The 36-item measure is heavily focused on romantic attachment and pair-bonding and, while intriguing, did not offer an opportunity to help further the understanding of Conscientiousness and its facets. It was not included in the second, third or fourth study.

Grit-S

Grit was measured with the Grit-S measure, comprised of the facets of Consistency of Interest and Perseverance of Effort (Duckworth, 2009). The measure has 8 total items including "Setbacks don't discourage me" and "I am a hard worker" and is measured on a five point Likert scale. Its inclusion was paramount to the assessment of

Conscientiousness as well as offering a chance to move a chaotic argument about its proper place within the Personality assessment landscape towards resolution.

Determination

The Determination scale is an unpublished scale created by Hoyle et al. (2020) and was intended to be an improvement on the Grit-S scale. Duckworth and Hoyle collaborated in this effort but found the scales should be considered separately rather than one being an improvement on the other. This 10 item scale added context and expanded items from the Grit-S. These included items like "I refuse to abandon my valued goals, even when others tell me achieving them seems unlikely" and "No matter their difficulty, I don't lose track of things that I most want to achieve in life".

BFI-2

The BFI-2, which measures the Big Five traits and associated facets, was included here to avoid the common error of trying to establish new measures independent of established ones (Soto & John, 2017). By including the full 60 item BFI-2, the new measure as well as measures commonly criticized as redundant, like the Grit-S with Conscientiousness, could be tested within the larger personality landscape. This offered an opportunity to make sure the new measure assessed information within the Conscientiousness dimension while remaining orthogonal to other Big Five dimensions.

HEXACO Conscientiousness and Honesty/Humility Dimensions

The HEXACO was included for similar reasons as the BFI 2 (Lee & Ashton, 2018). The HEXACO is actually a 6 trait measure and includes Honesty/Humility as a distinct trait. It was important to test the Conscientiousness dimension against the new,

and peripheral measures to make sure the new items were properly situated within the greater personality landscape. But, as the Honesty/Humility dimension is novel, and unique to the HEXACO's interpretation of personality traits, it was important to test it here as well. These dimensions came from the 100 item HEXACO and were measured on a one to five Likert scale. The Conscientiousness dimension included the facets of Organization, Diligence, Perfectionism, and Prudence. The Honesty/Humility dimension included facets of Sincerity, Fairness, Greed Avoidance, and Modesty.

IPIP-NEO

The IPIP-NEO was one of only two measures included in this dissertation which had a dedicated facet intended to measure an aspect of Self-Control (Goldberg et al., 2006). In study 1, the general Conscientiousness scale was used, however in study 4 the facet of self-discipline was included. Admittedly, this measure was underutilized in the overall dissertation as a technical difficulty precluded it from being added to the data collection in study 3. As has been discussed, the way self-control is situated within the conscientiousness landscape is vital to this project. Greater utilization of the self-discipline facet of the IPIP-NEO would have been immensely useful. Regardless, the self-discipline facet included items like “I rarely waste my time” and “I complete tasks successfully” and was measured on a 1 to 5 Likert scale and offered valuable insight when it was included properly.

Chernyshenko Conscientiousness Scale

The Chernyshenko Conscientiousness Scale is a 6 facet measure dedicated only to aspects of Conscientiousness (Green et al., 2016). These facets include Order,

Industriousness, Virtue, Traditionalism, Self-Control and Responsibility. Measured on a 1 to 5 Likert scale, this 60 item measure offered the most current and complete measure of Conscientiousness available, as well as another dedicated facet of Self-Control. The Chernyshenko Conscientiousness Scales were used in studies 2, 3 and 4.

General Measures Discussion

For Study 1, several of these measures of personality and four basic outcome variables were included. These were the FoC Scale, the Experiences in Close Relationships Revised (ECRR) (Fraley et al., 2000), the Grit-S (Duckworth, 2009), the Determination Scale (Hoyle et al., 2020), the 60 question BFI-2 (Soto & John, 2017), the Conscientiousness dimension of the 100 question HEXACO (Lee & Ashton, 2018), and finally a general 20 question Conscientiousness dimension from the IPIP-NEO (Goldberg et al., 2006). Participants were also asked to include their high school and college GPA, SAT scores and their experience with athletics presented in a 1 (no formal participation) to 5 (extensive college participation) scale. These outcome variables were selected for several reasons. GPA and standardized test scores are the most appropriate and closely aligned measures of academic achievement in a college sample. The final question about athletic participation was included to reveal the potential value in the development of a future project that evaluates self-control in college athletes. Unfortunately, self-reporting of grade and standardized test scores proved woefully unreliable and offered little additional benefit. They were not used in further analyses.

Several adjustments to the list of measures for Study 2 were implemented. As will be discussed in the next section, a revised FoC scale based on data from Study 1, the

Experiences in Close Relationships Revised was dropped and the Chernyshenko Conscientiousness Scale was added (Green et al., 2016), along with the Grit-S, Determination Scale, 60 question BFI-2, HEXACO Conscientiousness, and the self-discipline facet of the IPIP-NEO. Finally, for Study 3 and 4, a final version of the FoC scale was added while the remaining included scales were unchanged. A table of the measures included in each study as well as their facet level Cronbach's Alphas are included here (Table 3).

Table 3

List of Cronbach's Alpha for All Included Measures

Measures	Study 1	Study 2	Study 3	Study 4
ECRR				
Avoidance	.93			
Anxiety	.91			
Grit-S				
Consistency of Interest	.81	.75	.75	.82
Perseverance of Effort	.78	.76	.76	.80
Determination	.91	.89	.91	.93
BFI-2 Extraversion				
Sociability	.83	.82	.80	.82
Assertiveness	.76	.72	.69	.78
Energy Level	.66	.68	.66	.75
BFI-2 Agreeableness				
Compassion	.58	.57	.61	.59
Respectfulness	.65	.66	.63	.65
Trust	.64	.56	.67	.75
BFI-2 Conscientiousness				
Productiveness	.71	.67	.66	.77
Organization	.77	.83	.80	.87
Responsibility	.65	.63	.67	.75
BFI-2 Neuroticism				
Anxiety	.61	.72	.76	.80
Depression	.78	.75	.78	.83
Emotional Volatility	.81	.80	.82	.86

BFI-2 Open-Mindedness				
Aesthetic Sensitivity	.54	.56	.70	.80
Intellectual Curiosity	.66	.67	.68	.65
Creative Imagination	.64	.69	.75	.77
HEXACO Conscientiousness				
Diligence	.72	.76	.73	.77
Organization	.75	.72	.70	.77
Perfectionism	.62	.70	.64	.64
Prudence	.82	.56	.69	.75
IPIP				
General Conscientiousness	.93			
Self-Discipline		.75		.92
Chernyshenko Conscientiousness Scale				
Order		.87	.88	.90
Industriousness		.81	.82	.84
Virtue		.70	.72	.80
Traditionalism		.70	.79	.84
Self-Control		.75	.70	.78
Responsibility		.57	.57	.52
HEXACO Honesty/Humility				
Sincerity			.56	.76
Fairness			.66	.78
Greed			.72	.77
Modesty			.63	.66

Study 1

Study 1 was conducted in an effort to begin testing theories and research questions about the nature of Conscientiousness and to begin development into a new measure that captured the initiatory and inhibitory elements of the trait. There were seven different measures in this study. Please refer to the Appendix for a list of items from included measures that are not otherwise readily available online, like the BFI-2. This included the initial FoC items generated to begin testing theories around additional

dimensions of Conscientiousness (see Appendix B). Experience in Close Relationships Revised was also added as there was some conjecture that correlations may be revealed between attachment styles, which could possibly also transfer to goals and achievement, and individual differences in Conscientiousness. This was more exploratory than a clear extension of the current literature. In addition, the eight item Grit-S scale was included which is a quintessential aspect of this and all subsequent studies given the interest in the subject as well as the pantheon of detractors. An endless number of researchers have pointed out the errors in Duckworth's work, but none have provided ample evidence about where Grit should be situated in the personality landscape. A determination scale was also included, developed by a Duckworth collaborator. Hoyle et al. (2020) initially intended to improve upon the Grit-S scale but instead found they may have captured a slightly different concept. Lastly, the established measures of a full Big Five Inventory 2, the Conscientiousness axis of the HEXACO and the general conscientiousness dimension from the IPIP were added. These serve as the personality framework for positioning these new measures.

Participants

Study 1 included N = 265 undergraduate students from the University of California, Riverside who received introductory psychology course credit for their participation. The sample was 59% female with an average age of 19.93 years. Participants filled out the survey completely online using Qualtrics software.

Table 4

Factor Analysis of Facets of Self Control Scale Version 1

	Factor 1	Factor 2	Factor 3
17. When I want to pursue something, I usually go all-out to get it.	.87	-.22	.04
1. I am efficient at making progress towards my goals.	.79	.08	-.02
10. I carefully plan how to attain my goals.	.71	.12	-.12
21. I tend to devote large amounts of time to attaining my goals.	.69	.00	.08
28. I look for the most effective strategy to accomplish my goals.	.61	.14	-.10
27. It is easy for me to develop productive routines.	.58	.16	-.03
20. I spend most of my time pursuing a few goals until they are completed.	.55	.02	.19
19. I spend most of my time pursuing one goal until it is completed.	.43	.19	.21
13. I do not miss my goal-related commitments for any reason.	.43	.16	.14
25. I have accomplished goals that took more than a year to achieve.	.40	.04	-.11
23. Nearly all of my activities are focused on attaining my goals.	.39	-.01	.32
8. I often act on impulse. *	-.10	.79	.00
9. I often ignore my goals and act on the spur of the moment. *	.10	.69	-.02
7. I often feel compelled to say things without thinking. *	.02	.59	-.21
18. I sometimes start working on new goals without thinking about how I will attain them. *	.15	.41	-.03
2. I am rarely distracted from my goals.	.29	.40	.29
6. I concentrate easily.	.29	.38	.22
12. During the pursuit of my goals, thoughts about other activities rarely cross my mind.	.00	-.14	.67
11. During the pursuit of my goals, thoughts about social interactions rarely cross my mind.	-.22	.05	.58
4. I often focus on my goals and become unaware of my surroundings.	.18	-.22	.50
24. Once I have chosen a goal, almost nothing can distract me from achieving it.	.32	.18	.41
5. I pursue my goals and ignore distractions.	.31	.40	.41
3. When I choose to pursue a goal, little can deter my focus.	.36	.15	.39
14. Thoughts about missing my goal related commitments never crosses my mind.	-.03	.00	.26
15. Criticism does not deter me from pursuing my goals.	.19	.14	.20

Notes: * denotes item that was reverse worded in original scale.

Study 1 Analysis

Exploratory factor analysis revealed a three factor structure for version 1 of the FoC scales. Factor loadings are listed in Table 4. Preliminary eigenvalue difference analysis and fit indices suggest three factors are the best solution for the data (eigenvalues: 8.657, 2.348, 1.433, 1.220, 1.067, 0.952, 0.895, 0.873, 0.788, 0.747, 0.713). Factor 1 is largely dominated by items focused on goal related pursuit including "When I want to pursue something, I usually go all-out to get it" and "I am efficient at making progress towards my goals". Factor 2 contains the group of reverse worded items which demands further consideration, but the concept represented by factor 2 is largely consistent. This includes the items "I often act on impulse" and "I often ignore my goals and act on the spur of the moment" which suggests the factor is measuring something closely related to impulse control. Factor 3 captures the reported ability to narrowly focus on goals and to some degree, lose awareness of unrelated distractions like social interactions or recreational activities. This factor is also explained by the item "I often focus on my goals and become unaware of my surroundings".

Two additional exploratory factor analyses were run on the data after the FoC factors were established by summing all items with loadings greater than .40 on each factor and then calculating a mean. This represented the facet score. The first was a facet level exploratory factor analysis on all Conscientiousness facets, with the FoC facets included. Factor 1 is a collection of the proactive elements of Conscientiousness, captured by Determination, Perseverance of Effort and Productivity. Factor 1 also includes the FoC facets associated with goal pursuit and goal focus. Factor 2 is a clear

order factor. Both established order facets from the BFI-2 and the HEXACO fall here. This will be a persistent theme throughout the remainder of this project. Factor 3, with its strongest factor loading of FoC impulse control gives ample indication that impulse control should be considered within the Conscientiousness conceptual dimension.

Table 5

Study 1 Factor Analysis of Conscientiousness Facets

	Factor 1	Factor 2	Factor 3
Determination	.94	-.09	-.11
Grit - Perseverance of Effort	.86	.02	.04
HEX Diligence	.61	.19	.13
FoC1	.57	.07	.26
BFI Productivity	.47	.32	.18
FoC3	.47	-.11	.14
HEX Perfectionism	.40	.33	-.05
HEX Order	-.04	.95	.00
BFI Organization	.03	.81	-.01
BFI Responsibility	.21	.41	.26
FoC2	.01	-.08	.93
HEX Prudence	-.04	.10	.73
Grit - Consistency of Interest	.15	.18	.54

The second additional exploratory factor analysis combined the full BFI-2, the only full personality inventory included in this work, to test if facets of the FoC would perhaps align with traits outside of Conscientiousness. Of note, in Table 6, the BFI-2 followed expected factor alignments with each facet falling on its expected dimension. The FoC dimensions all aligned with the Conscientiousness trait. This suggests that even though further refinement and data are required to confirm where exactly these items

should fall within the Conscientiousness structure, at least they all should be considered part of Conscientiousness.

Table 6

Study 1 Exploratory Factor Analysis of BFI-2 and Facets of Control

	C	N	A	E	O
Productivity	.80	.02	-.07	.17	.09
FoC1	.73	-.01	.03	.11	.02
Responsibility	.70	.02	.24	-.03	.04
FoC2	.69	-.11	-.03	-.22	-.08
Organization	.60	-.04	.12	-.02	-.06
FoC3	.54	-.04	-.22	.04	-.12
Emotional Volatility	-.10	.79	-.03	.22	-.13
Anxiety	.12	.76	.11	-.12	.08
Depression	-.06	.73	-.10	-.23	.04
Compassion	-.05	.10	.72	.16	.09
Respectfulness	.26	-.02	.70	-.23	.05
Trust	-.10	-.20	.60	.19	-.04
Sociability	.00	-.04	.04	.74	-.01
Energy Level	.16	-.10	.13	.62	.09
Assertiveness	.20	-.07	-.20	.51	.33
Intellectual Curiosity	-.04	-.05	.04	-.06	.76
Creative Imagination	.06	-.06	-.02	.10	.59
Aesthetic Sensitivity	-.11	.19	.07	.06	.53

Note: All facets listed are from the BFI-2 unless noted as FoC.
C = Conscientiousness, N = Neuroticism, A = Agreeableness,
E = Extraversion, O = Openness

Study 1 Discussion

Consideration of the FoC measure reveals early indications that it may be important to the personality trait landscape. However, the first factor defined by items related to goal pursuit exceeded correlation thresholds with BFI-2 Conscientiousness (r = .61) which suggests the items may be too closely aligned with the trait. Factor 1 was also highly correlated with BFI-2 Productiveness (also r = .61). It can be safely concluded that

these items were too closely related to Conscientiousness which was not the goal of the project. Of greatest interest were the items regarding Impulse Control. Not only did this facet dominate its own factor in the Conscientiousness EFA (Table 5), but it also had the lowest correlations with BFI-2 Conscientiousness facets (none exceeding .50). Every indication points to Impulse Control being an important part of the understanding of Conscientiousness. Every effort was made to learn about what did and did not work in study 1 and carry those new findings on to further iterations of the FoC. Only the items related to impulse control were precisely carried on to Study 2 while the remaining items were either dropped (those too closely related to Conscientiousness) or re-worded (those less associated with goal pursuits). It should also be noted that the Experiences with Close Relationships Revised offered very little information to the understanding of Conscientiousness, FoC or any of the other related traits and was dropped from further studies.

Study 2

During the analysis of Study 1 and in preparation for Study 2, the Chernyshenko Conscientiousness Scale was identified for inclusion in the remaining studies while the Experiences with Close Relationships Revised was dropped. This six facet measure is focused solely on Conscientiousness, making it especially well-suited for inclusion in this dissertation. The IPIP measure was the only other measure that was altered. Rather than the general Conscientiousness version of the IPIP, a more targeted Self-Discipline facet was included.

Informed by study 1, items of the FoC were designed with the intention of avoiding initiatory aspects of Conscientiousness and rather attempt to capture aspects of inhibitory self-control. As seen in Appendix C, questions about impulse control were preserved and those most related to Conscientiousness were removed. Questions were added that were intended to capture whether a participant was able to become unaware of their potential distractions like "I can comfortably read a book in a noisy environment" and "I seem harder to distract than my peers". Lastly, valence was added to questions about distractions rarely crossing a participant's mind capitalizing on words like "important". "When I am working on something important, thoughts about social interaction rarely cross my mind". Version 2 of the FoC was intended to be far more focused on inhibition.

Participants

Study 2 participants were again comprised of undergraduate students at the University of California, Riverside in an introductory psychology course. This study had a slightly larger sample size (n = 348) but also a more skewed distribution of female identifying participants (74.4% female). The mean age (19.37) was nearly identical to study 1 and ethnicity information was also collected which was not done in study 1. While ethnicity data was not included in any analysis for the current project, it is important to note that the sample is predominantly Asian (43.1%) and LatinX (43.2%), White (8.60%), Middle Eastern (4.60%), Black (4.00%), and other (5.60%), consistent with the population at University of California, Riverside.

Study 2 Analysis

Exploratory factor analysis of the Study 2 data revealed another three factor solution for the FoC items as seen in Table 7. The series of eigenvalues are listed here: 5.601, 1.802, 1.449, 1.140, 1.076, 0.931, 0.854, 0.817, 0.685, 0.672, 0.592. Factor 1 is explained by items relating to distractions being easily ignored or not occurring to participants. Items like "I don't seem to notice distractions" and "It is effortless for me to ignore distractions'' are the items with the strongest factor loadings. Factor 2 seems to suggest differences in a participant's ability to effortfully choose to ignore distractions containing items like "I never question whether I can attain my goals" and "Even my own doubts don't seem to deter me from pursuing my goals". Factor 3 is problematic as it only has two items loading onto the dimension. Both of the questions are unique however, both containing the word "act". There are few concrete conclusions to be drawn from a factor with two items however they indicate that future versions of items should explore this idea of action relating to impulse.

An exploratory factor analysis which includes all Conscientiousness facets including the FoC, incorporates six more facets from the previous study with the addition of the Chernyshenko Conscientiousness scale. However, the structure from Study 1 replicates closely as seen in Table 8. Factor 1 again captures differences in Determination, Grit - Perseverance of Effort, Industriousness (from the Chernyshenko) and Productiveness (from the BFI-2). This first factor also includes the majority of items from the FoC which is sub optimal and will be addressed in the discussion. The second factor is again a clear, and also reinforced measure of Order. Similar to study 1, BFI-2 Organization and

Table 7

Exploratory Factor Analysis of Facets of Control Version 2

Item	Factor 1	Factor 2	Factor 3
8. I don’ t seem to notice distractions.	.75	.03	.01
18. It is effortless for me to ignore distractions.	.71	.03	.02
9. Distracting impulses rarely occur to me.	.69	.00	.09
11. I can get work done, even at a party.	.61	.00	-.10
12. I seem harder to distract than my peers.	.54	.06	.12
5. I can comfortably read a book in a noisy environment.	.50	-.16	-.22
4. When pursuing a goal, thoughts about other activities rarely cross my mind.	.49	.18	.15
19. When I am working on something, I usually keep working until I choose to stop.	.38	-.10	.04
14. I don’ t really need to plan to work on my goals, I just do it.	.38	.15	-.14
15. I never question whether I can attain my goals.	-.05	.74	-.04
6. Even my own doubts don’ t seem to deter me from pursuing my goals.	-.05	.68	.04
1. When I choose to pursue a goal, little can deter me.	.01	.60	.07
7. I can easily focus on my long-term goals and not notice distractions along the way.	.26	.59	.01
17. Pursuing my goals often feels automatic, requiring little effort.	.16	.47	-.19
3. When I am working on something important, thoughts about social interactions rarely cross my	.10	.36	.10
16. I feel little concern for the opinion of others when I pursue my goals.	.08	.19	-.06
13. I rarely act on the spur of the moment.	.00	-.04	.86
10. I rarely act on impulse.	.07	.09	.66
2. When I work at getting something done, I often become unaware of my surroundings.	.10	.14	-.18

HEXACO Order load together but the Order facet from the Chernyshenko also loads strongly. Finally, factor 3 is made of the Impulse Action items from the FoC, the Prudence facet from the HEXACO and the Self-Control facet from the Chernyshenko.

It is also important to point out items, facets and concepts that are not loading onto any factors. Most notably, Responsibility failed to find safe shelter in the current factor structure. In these data, responsibility, a primary facet from the BFI-2, seems to be unclear in its role for understanding individual differences in Conscientiousness. Responsibility from the Chernyshenko scale, also finds a similar fate. This is not entirely unexpected as the Responsibility facet has been a less reliable facet across studies with reduced alphas and predictive capacities. As well, both Virtue and Traditionalism from the Chernyshenko fail to load meaningfully.

While a sub optimally loading Responsibility factor is not necessarily a cause for alarm, the extra exploratory step was taken to possibly add a fourth factor in this EFA. The eigenvalues certainly allow for this flexibility (top values listed here: 7.994, 2.424, 1.541, 1.139, 1.063, 0.767, 0.611, 0.587, 0.545, 0.481, 0.450) and the fit indicator of Root Mean Square Error of Approximation (RMSEA) improves from .93 to .71. However, the 4 factor structure loses thematic consistency and relegates FoC 1 and FoC 2 to their own factor with Grit – Consistency of Interest. The apparent result of this additional factor does little to meaningfully reincorporate Responsibility. In both the three and four factor structure, a factor of proactive goal focus, an order factor and a factor of self control are consistent with the fourth factor becoming a largely uninterpretable factor. Thus, a three factor solution is best suited for these data.

Table 8

Study 2 Exploratory Factor Analysis of Conscientiousness Facets

	Factor 1	Factor 2	Factor 3
Determination	.82	-.04	-.08
Grit - Perseverance of Effort	.82	-.05	-.02
HEX Diligence	.82	.02	.07
Chernyshenko Industriousness	.75	-.01	.07
BFI Productivity	.75	.12	.05
FoC2	.67	-.12	-.16
IPIP Self-Discipline	.62	.22	.04
FoC1	.56	-.05	-.06
Grit - Consistency of Interest	.47	.00	.25
HEX Perfectionism	.40	.26	.12
Chernyshenko Responsibility	.38	.27	.21
BFI Organization	-.04	.95	-.01
Chernyshenko Order	-.04	.92	-.01
HEX Order	.13	.81	.01
Chernyshenko Self-Control	-.11	.02	.92
HEX Prudence	.17	-.05	.74
FoC3	.03	-.03	.55
BFI Responsibility	.33	.25	.34
Chernyshenko Virtue	.17	.02	.32
Chernyshenko Traditionalism	.10	.21	.27

Again, the facets of the FoC were factor analyzed within the overall BFI-2 framework as seen in Table 9. Throughout this project, thresholds for factor loadings were universally set at .40 to be considered strong enough for inclusion. In this case, facet 3 from the FoC fell short of that threshold. It is still arguably prudent to include, however as the loadings on other facets are far lower than the associated .36 here. This factor has also already been reduced to an indicator rather than a robust factor in previous discussion. Applying the same principles, it seems that further investigation is warranted

regarding actions an individual takes relating to impulse control within the Conscientiousness framework.

Table 9

Study 2 Exploratory Factor Analysis of Facets of Control and BFI-2

	C	N	A	E	O
Productivity	.68	-.04	.11	.13	.12
FoC1	.66	-.14	-.29	-.09	.09
Responsibility	.57	.11	.37	.05	-.02
Organization	.51	.17	.25	.02	-.14
FoC2	.49	-.26	-.24	.14	.01
FoC3	.36	-.09	.17	-.21	-.07
Anxiety	.10	.77	.15	-.05	-.04
Emotional Volatility	-.11	.74	-.21	.12	.05
Depression	-.06	.72	-.07	-.19	.04
Respectfulness	.07	-.14	.76	-.15	.07
Compassion	.01	.18	.65	.15	.12
Trust	-.02	-.21	.55	.12	.01
Sociability	-.05	-.03	-.01	.85	-.04
Energy Level	.06	-.15	.25	.60	.11
Assertiveness	.22	.05	-.21	.59	.16
Intellectual Curiosity	.04	-.06	.06	-.06	.71
Creative Imagination	.04	.02	-.05	.15	.67
Aesthetic Sensitivity	-.08	.11	.12	-.10	.63

Note: All facets listed are from the BFI-2 unless noted as FoC.
C = Conscientiousness, N = Neuroticism, A = Agreeableness,
E = Extraversion, O = Openness

Study 2 Discussion

The addition of the Chernyshenko Conscientiousness scale was instrumental in furthering this research project. Not only does it reinforce previous research questions and findings, but also solidifies the need for self-control to be included in the structure of Conscientiousness. The priority for future versions of the FoC was to reduce item and

facet associations with Grit/Industriousness/Productiveness and to bolster and expand items related to impulse control.

There is ample evidence to suggest that the FoC items used here are closely related to the Conscientiousness domain. No facet level correlations exceeded .50 with the correlation between Factor 1 of the FoC and BFI Productiveness being the highest (r = .48). Most encouragingly, the third factor of the FoC including the two items associated with impulse control, did not reach correlations of .3 with any of the BFI-2 Conscientiousness facets. The highest correlation (r = .28) was between the impulse control facet and BFI-2 Responsibility. This is a substantial indication that impulse control specifically, could be quite underrepresented in the BFI-2 and offer a more complete understanding of trait Conscientiousness.

Study 3

It is important to note that data for study 3 were collected as the Covid-19 pandemic was beginning and as the University of California, Riverside was transitioning to remote learning and operations. Fortunately, this research was able to proceed as data were collected totally online via Qualtrics but the transition, worldwide disaster and ensuing chaos should not be wholly ignored. The number of participants fell below expectation and the devastation clearly presents confounds.

The measures included in study 3 only deviated in two ways from study 2. Seven additional questions were added to the FoC with the intention of expanding the impulse control factor. Also added were questions that further diversified sources of distractions which included social distractions, noise distractions, hunger and even moral distractions

("I would rather do what is wise than what is fun"). The other change was an unintended omission where data from the IPIP Self-Discipline was not collected.

Participants

Data for study 3 was again collected from a University of California, Riverside undergraduate sample in an introductory psychology course. After participants who failed attention checks were set aside, N = 214 remained in the assessable sample. The male/female ratio was more normal than that of study 2 including 60.3% females. Age (19.76) and ethnicity distributions were all similar to previous studies and in line with expectations from the undergraduate sample, Asian (43.50%), LatinX (35.98%), Middle Eastern (5.60%), White (5.10%), Black (4.20%) and Other (5.60%). While the pandemic was expected to cause confounds, it did not appear to alter attention check failure rates or any other indicators of poor data. The ages, gender ratios, ethnicities were all in line with expectations for the sample.

Study 3 Analysis

Exploratory factor analysis supports a three factor structure for study 3 data. This three factor structure was supported by the eigenvalues: 6.310, 2.433, 1.715, 1.619, 1.186, 1.179, 0.995, 0.936, 0.858, 0.771, 0.724. While common to make assessments about a factor based on the strongest loading items, Factor 1 has 5 items that all load stronger than .60 and are largely orthogonal to Factors 2 and 3. Items like "I never question whether I can attain my goals", "Even my own doubts don't seem to deter me from pursuing my goals", "When I choose to pursue a goal, little can deter me" all show good theoretical consistency. These items all seem to reflect an individual's focus on

their goals. It makes logical sense to refer to Factor 1 as Goal Focus. Factor 2 demonstrates a clear grouping of items related to impulse control. As was the intention when developing this version of the scale, six items relating to impulse control all loaded onto Factor 2. Here it makes sense to refer to this factor as Impulse Control. Not only did the doubleton Factor 3 carry over from Study 2 regarding acting on impulse but items like "My actions are usually based on logic rather than impulse" and "I would rather do what is wise than what is fun" are also included. This can be viewed as a step in the right direction in expanding on the intriguing doubleton from study 2 resulting in a more robust factor. Factor 3 represents a slightly unexpected conceptual reorganization. Items loading on the third factor are clearly related to individual differences in a participant's ability to resist distraction. "I can get work done, even at a party", "I can comfortably read a book in a noisy environment" and lastly "I don't seem to notice distractions" make up this factor. This factor appears to be aptly named Undistractibility.

Table 11 displays the exploratory factor analysis at the facet level for all data collected on conscientiousness scales. Conscientiousness again seems defined by a factor associated with proactive work, a factor of order and a presence of a factor related to self-control. Factor 1 consistently contains the facets related to working, being productive and demonstrating effort. The strongest factor loadings are those associated with the Perseverance of Effort facet of the Grit-S scale, Determination and Goal Focus from the FoC. BFI-2 Productiveness and Chernyshenko Industriousness are also included. While factor 1 shows clear consistency, study over study, factor 2 truly demonstrates a remarkable phenomenon. In every study, Order is clearly related to the structure of

Table 10

Exploratory Factor Analysis of Facets of Control Version 3 Study 3

Item	Goal Focus	Impulse Control	Undistractibility
22. I never question whether I can attain my goals.	.67	-.11	-.04
11. Even my own doubts don’ t seem to deter me from pursuing my goals.	.63	-.02	-.04
7. When I choose to pursue a goal, little can deter me.	.62	.06	.02
29. Pursuing my goals often feels automatic, requiring little effort.	.61	-.15	-.02
21. When pursuing a goal, thoughts about other activities rarely cross my mind.	.60	.05	.07
26. I can easily focus on my long-term goals and not notice distractions along the way.	.55	.22	.11
24. I enjoy many activities but like to stay focused on getting things done.	.46	.30	-.03
12. I can stay focused on working even when I am not feeling well.	.43	-.21	.25
23. I can work even when I am tired.	.37	-.08	.25
25. When I am working on something, I usually keep working until I choose to stop.	.36	.16	-.09
15. If I am getting things done, I will stay at it even if I get tired or hungry.	.33	.00	-.06
9. It is effortless for me to ignore distractions.	.32	.16	.24
4. When I am working on something important, thoughts about social interactions rarely cross my mind.	.30	.27	.12
16. I feel little concern for the opinion of others when I pursue my goals.	.25	-.19	.13
28. I rarely act on impulse.	-.10	.81	-.01
13. I rarely act on the spur of the moment.	.02	.64	.13
10. My actions are usually based on logic rather than impulse.	.17	.50	-.19
27. I often turn down chances to be with friends so I can work to achieve my goals.	.12	.43	.07
8. Distracting impulses rarely occur to me.	.36	.43	.02
30. I would rather do what is wise than what is fun.	.31	.40	-.11
5. I don’ t really need to plan to work on my goals, I just do it.	.29	-.36	-.03
17. I can get work done, even at a party.	.04	-.06	.69
19. I can comfortably read a book in a noisy environment.	-.11	.02	.66
3. I don’ t seem to notice distractions.	.27	.28	.40
1. I seem harder to distract than my peers.	.23	.24	.32
6. When I work at getting something done, I often become unaware of my surroundings.	.16	.04	.23

Conscientiousness. The Chernyshenko, BFI-2 and HEXACO all contain items related to Order and at the facet level, they dependably load together on the same factor with strong factor loadings. Factor 3 clearly represents the inhibitory aspects of the trait, including Self Control from the Chernyshenko, Prudence from the HEXACO and Impulse Control from the FoC.

Facets from the FoC load specifically onto the Conscientiousness dimension when factor analyzed with the BFI-2. As expected, all BFI-2 facets loaded correctly onto their respective traits and two of the three facets from the FoC loaded exclusively onto the Conscientiousness dimension. What becomes apparent is first, that the facet containing items related to impulse control was the dominant and strongest loading facet on Conscientiousness, reinforcing the importance of including aspects of impulse control on the understanding of the trait. Frequently, this project has presented compelling evidence that no understanding of Conscientiousness is complete in the absence of Impulse Control and as well, no personality trait measure is complete without proper items assessing the facet.

Unfortunately, Undistractibility from the FoC failed to load on any one facet. This is however, not without implication. The facet is dominated by items pertaining to an absence of awareness to otherwise clear distractions. The facet's strongest positive loading is on the Conscientiousness dimension but has an equally strong negative loading on Agreeableness. Established BFI-2 facets tend to be orthogonal, yet some facets

between Conscientiousness and Agreeableness have weak positive associations like Responsibility and Order. It appears that Undistractibility from the FoC is potentially an absence of Agreeableness while also explaining some of the Conscientiousness dimension.

Table 11

Study 3 Exploratory Factor Analysis of Facets of Conscientiousness

	Factor 1	Factor 2	Factor 3
Grit - Perseverance of Effort	.84	.01	-.05
Determination	.81	-.03	-.07
Goal Focus FoC	.79	-.18	-.04
HEX Diligence	.75	.11	.09
BFI Productivity	.66	.22	.06
Chernyshenko Industriousness	.61	.12	.15
Grit - Consistency of Interest	.43	.00	.16
Chernyshenko Responsibility	.40	.13	.24
HEX Perfectionism	.33	.16	.29
Undistractibility FoC	.33	-.19	-.09
BFI Organization	.01	.92	-.03
Chernyshenko Order	-.09	.91	.01
HEX Order	.13	.79	.01
Chernyshenko Self-Control	-.12	-.02	.94
HEX Prudence	.22	.01	.65
Impulse Control FoC	.28	.01	.52
Chernyshenko Traditionalism	-.04	.16	.41
BFI Responsibility	.33	.19	.37
Chernyshenko Virtue	.25	.05	.36

Table 12

Study 3 Exploratory Factor Analysis of BFI-2 with Facets of Control

	N	C	A	E	O
Depression	.79	-.07	-.19	-.14	.06
Anxiety	.79	.10	.07	-.02	.00
Emotional Volatility	.74	-.09	-.04	.13	-.05
Impulse Control FoC	.00	.74	-.08	-.12	.00
Productivity	-.08	.71	.09	.15	.01
Responsibility	.06	.60	.31	.01	.02
Goal Focus FoC	-.38	.53	-.24	.09	.09
Organization	.17	.44	.38	.18	-.22
Respectfulness	-.10	.13	.71	-.12	.14
Compassion	-.02	.04	.66	.04	.20
Trust	-.28	-.12	.58	.04	-.01
Undistractibility FoC	-.10	.31	-.35	-.06	.16
Sociability	-.02	-.08	-.07	.80	.02
Assertiveness	.06	.22	-.11	.59	.19
Energy Level	-.11	.04	.23	.56	.02
Creative Imagination	-.05	-.05	.05	.14	.75
Aesthetic Sensitivity	.25	.02	.15	-.04	.56
Intellectual Curiosity	-.02	.11	.12	-.03	.47

Note: All facets listed are from the BFI-2 unless noted as FoC. C = Conscientiousness, N = Neuroticism, A = Agreeableness, E = Extraversion, O = Openness

Study 3 Discussion

In Study 3, considerable expansion of the Impulse Control facet of the FoC was achieved, individual differences in Goal Focus were reinforced and Undistractibility combined to produce an intriguing factor loading profile within the BFI-2. It is problematic that such a large number of items fell below the .4 loadings threshold on the FoC scale. Fortunately, this does not derail thematic factor cohesion of the facets or conclusions which do appear to largely support previous findings.

What gains further traction is that items designed to assess more multidimensional self-control are supported by the data. Self-control does not appear to be an umbrella term as it is so commonly used. Self-Control appears to be a differentiated trait fitting neatly within the established Big Five model of personality. Many models of self-control exist but few ask the question of impulse experience which seems core to the understanding of the behavior. This work demonstrates that there are individual differences in the way people experience distracting impulses. Some people report a capability to read or work even through adverse situations that would not normally lend themselves to productivity. This is perhaps an indication that some individuals have a much higher threshold for the ability to be unaware of distractions.

There also seems to be ample evidence that the way people actively choose to deal with their impulses and distractions exists on a continuum. For the first time, these differences in impulse control are measured and situated within the established Big Five framework. This is at the heart of Conscientiousness, where the structure of Grit/Productivity, Order and Self-Control/Impulse Control seem to best describe the trait.

Study 4

Participants

Study 4 mirrored Study 3 closely with one major difference. Data were collected from a community sample online via Prolific. Participants were all from the United States and gender distribution was similar to the distribution in Study 3. There were three significant differences between the two samples in Study 3 and Study 4. Age, and ethnicity break down quite differently. Study 3 had a sample mean age of just under 20

(19.76) while Study 4 had a sample mean age just over 30 (30.79). The participants in Study 4 were almost 60% White. While Asian and LatinX, which made up nearly 80% (79.48%) of Study 3's sample, the groups represented 13.04% (Asian) and 8.70% (LatinX) in Study. The remaining participants were 9.70% Black and 9.36% Other. Finally, all participants in Study 3 (and Studies 1 and 2) were University of California, Riverside undergraduates while Study 4 was a community sample. These are all important distinctions from a psychometric comparison and measure reliability perspective.

Study 4 Analysis

Regardless of the sample differences, factor analytic model outcomes remain quite similar in the FoC. Eigenvalues again support a three factor structure (8.188, 2.162, 1.713 1.381, 1.289, 1.027, 0.904, 0.848, 0.790, 0.752, 0.658). The core of items for each factor of the FoC analysis in Study 3 replicated in Study 4's community-based sample. Factor 1 from Study 3 and 4 share the same seven strongest loading items, nearly in identical order. Factor 1 in Study 4 had more items reach the .4 factor loading threshold but the similarities in the top seven items reinforce the theoretical concept of Goal Focus. This factor is best represented by "Even my own doubts don't seem to deter me from pursuing my goals", "When I choose to pursue a goal, little can deter me" and finally "I enjoy many activities but like to stay focused on getting things done."

The strongest loading items on Factor 3 in Study 3 (Undistractibility), shift to Factor 2 in Study 4. They however maintain the same top three items. "I can comfortably read a book in a noisy environment", "I can get work done, even at a party" and "I don't

seem to notice distractions" loaded together, as in Study 3. Undistractibility included two additional items, one of which shifted from Factor 1 (Goal Focus) in Study 3, "I can stay focused on working even when I'm not feeling well" and another that did not load on any factor in Study 3, "I can work even when I am tired." Thematically, these items and the factor maintain their measurement of individual differences in the awareness of distractions. Individuals in this sample, as in Study 3, appear to have differences in their ability to focus through distractions, even when conventional wisdom suggests that their focus probably should have shifted.

Factor 3 (Impulse Control) in Study 4 showed strong replication of Impulse Control in Study 3. The top three strongest loading items, "I rarely act on impulse", "I rarely act on the spur of the moment" and "My actions are usually based on logic rather than impulse" were identical to Study 3. Given the consistent nature of these items asking participants about their actions related to distracting impulses across both studies, the idea that this factor is assessing Impulse Control is reinforced. There was some regression from the perceived progress made in item generation from Study 3. Factor 2 (Impulse Control) in Study 3 saw 6 different items loading above the .4 threshold and only the top three of those replicated in Study 4. The three lesser loading items in Study 3 all shifted to Factor 1 (Goal Focus) in Study 4. In total, the strength of the factors appears to be consistent and replicable even when the demographics of the samples change critically.

As with the previous three studies, Conscientiousness facet level exploratory factor analysis reveals a three factor model. Factor 1 consists of the proactive aspects of

Table 13

Exploratory Factor Analysis of Facets of Control Version 3 Study 4

Item	Goal Focus	Undistractibility	Impulse Control
11. Even my own doubts don’ t seem to deter me from pursuing my goals.	.72	.04	-.07
7. When I choose to pursue a goal, little can deter me.	.71	-.08	-.05
24. I enjoy many activities but like to stay focused on getting things done.	.68	-.17	.11
26. I can easily focus on my long-term goals and not notice distractions along the way.	.63	.20	.01
29. Pursuing my goals often feels automatic, requiring little effort.	.60	.07	.00
22. I never question whether I can attain my goals.	.59	.07	-.11
27. I often turn down chances to be with friends so I can work to achieve my goals.	.53	-.13	.04
21. When pursuing a goal, thoughts about other activities rarely cross my mind.	.53	.19	.09
4. When I am working on something important, thoughts about social interactions rarely cross my mind.	.52	.05	.11
8. Distracting impulses rarely occur to me.	.46	.22	.19
30. I would rather do what is wise than what is fun.	.44	-.13	.34
1. I seem harder to distract than my peers.	.44	.38	.08
9. It is effortless for me to ignore distractions.	.42	.19	.09
16. I feel little concern for the opinion of others when I pursue my goals.	.39	-.07	-.11
6. When I work at getting something done, I often become unaware of my surroundings.	.39	.11	-.23
25. When I am working on something, I usually keep working until I choose to stop.	.38	.10	.08
5. I don’ t really need to plan to work on my goals, I just do it.	.27	.09	-.12
19. I can comfortably read a book in a noisy environment.	-.11	.69	-.05
17. I can get work done, even at a party	.08	.69	-.05
23. I can work even when I am tired.	-.02	.66	.05
12. I can stay focused on working even when I am not feeling well.	.11	.56	.12
3. I don’ t seem to notice distractions	.27	.49	.03
15. If I am getting things done, I will stay at it even if I get tired or hungry.	.19	.32	.17
28. I rarely act on impulse.	-.04	-.04	.85
13. I rarely act on the spur of the moment.	-.01	.05	.83
10. My actions are usually based on logic rather than impulse.	.17	.08	.50

the trait with Determination, Perseverance of Effort, Industriousness, Productiveness and Goal Focus from the FoC best describing the aspect of Conscientiousness. Factor 2, the Order factor, is dominated by exceedingly high factor loadings and noticeably orthogonal loadings on the other two factors. There is consistently strong evidence that understanding Conscientiousness is only complete by including Order. Factor 3 combines Prudence from the HEXACO, Self-Control from the Chernyshenko and the Impulse Control facet from the FoC.

Table 14

Study 4 Exploratory Factor Analysis of Conscientiousness Facets

	Factor 1	Factor 2	Factor 3
Determination	.92	-.01	-.17
Grit - Perseverance of Effort	.88	.00	-.04
HEX Diligence	.80	.01	.11
Goal Focus FoC	.78	.09	-.09
Chernyshenko Industriousness	.73	-.10	.23
BFI Productivity	.71	.21	.09
Undistractibility FoC	.49	-.03	-.10
Chernyshenko Responsibility	.47	-.04	.28
Chernyshenko Virtue	.43	-.06	.26
Grit - Consistency of Interest	.41	.11	.23
BFI Responsibility	.41	.20	.38
BFI Organization	.01	.97	-.04
Chernyshenko Order	-.06	.93	.00
HEX Order	.09	.79	.10
Chernyshenko Self-Control	-.08	-.01	.90
HEX Prudence	.10	.12	.72
Impulse Control FoC	.07	.09	.60
HEX Perfectionism	.31	.12	.33
Chernyshenko Traditionalism	.16	.17	.24

The facets of the FoC all had their strongest loadings on the Conscientiousness dimension of the BFI-2 with two of the three, Goal Focus and Impulse Control both

exceeding the .40 loading threshold. Undistractibility failed to meet the .40 threshold but did have its strongest loading on the Conscientiousness dimension. The facets of the FoC were noticeably non-orthogonal to Neuroticism and Extraversion. This is in contrast to the findings in Study 3 where non-orthogonality was related to the Agreeableness dimension. While the main factor loadings on the Conscientiousness dimensions are ideal, the loadings on alternate traits offer some interesting insight and opportunity for theory.

In this sample, the facets of the FoC appear to be highly related to Conscientiousness but also with the absence of Neuroticism. Individuals in this sample who were 10 years older and predominantly of white ethnicity, show increased emotional stability when they also self report greater self-control and impulse control. The Impulse Control facet is unique as well with its negative (-.32) loading on Extraversion. Participants higher in Impulse Control also seem to be less extraverted as well as reporting less neuroticism. Given that the main differences between the two samples is age and ethnicity, this is both strong support for the consistency of the structure of Conscientiousness while also offering intriguing avenues for further research.

Study 4 Discussion

The intent of Study 4 was to compare the findings from an undergraduate sample at a highly rated public university in Study 3 with a far less restrictive community sample. While there were differences, they are minimal. The core of the items from the FoC loaded almost identically, even in the same order in some cases. The first 7 items which loaded onto the Goal Focus dimension were identical to that in Study 3. The

Table 15

Study 4 Exploratory Factor Analysis of BFI-2 Facets and Facets of Control

	C	N	O	A	E
Productivity	.87	.01	.07	-.03	.15
Responsibility	.81	.02	-.03	.17	-.10
Organization	.68	.02	-.05	.06	-.06
Goal Focus FoC	.60	-.23	-.03	-.12	.24
Impulse Control FoC	.52	-.18	-.06	-.05	-.32
Undistractibility FoC	.27	-.20	.04	-.06	.21
Emotional Volatility	-.09	.87	-.09	-.03	.19
Anxiety	.10	.79	.06	-.02	-.19
Depression	-.21	.62	.02	-.02	-.28
Intellectual Curiosity	.00	-.08	.80	-.09	-.11
Aesthetic Sensitivity	-.12	.08	.68	.21	.00
Creative Imagination	.07	-.03	.67	.04	.22
Compassion	.08	.20	.18	.73	.06
Trust	-.10	-.31	-.08	.65	.20
Respectfulness	.23	-.17	.02	.63	-.22
Sociability	.00	-.04	.02	.08	.62
Energy Level	.24	-.14	.08	.15	.53
Assertiveness	.25	-.12	.18	-.23	.48

Note: All facets listed are from the BFI-2 unless noted as FoC. C = Conscientiousness, N = Neuroticism, A = Agreeableness, E = Extraversion, O = Openness

Impulse Control facet maintained its top three loadings and the Undistractibility facet the same. The items that changed between the two studies were typically those with loadings closer to the .40 threshold allowing for strong conclusions that the measure is capturing individual differences in aspects of Self-Control.

In addition, the structure of Conscientiousness was nearly identical to Study 3 with a proactive facet of Grit/Determination/Productiveness, an Order facet and an inhibitory facet of Self-Control. The exploratory factor analysis at the facet level of the BFI-2 including the FoC was similar as well, including the failure of the Undistractibility

facet to exceed the minimum .40 loading threshold. In sum, Study 4 confirms the structure of the FoC and related conclusions about the structure of Conscientiousness.

Additional Assessments

Grit

It has been a common occurrence in the literature to dismiss Grit (Credé et al., 2017). Rather than following the common trend, this research attempted to position the compelling construct within established personality measures. It does appear that some of the previous criticism regarding Grit is warranted. There is little evidence to suggest that Grit is an independent, stand-alone trait. As seen in Table 16, Grit shares strong correlational relationships with BFI-2 trait Conscientiousness (r = .66) and its facet, Productiveness (r = .71). Table 16 includes all the correlations from Study 3 and Study 4 that met or exceeded .50 after a correlation matrix was produced using all traits and facets from every measure collected in the study, which totaled 40. This suggests that Grit has a high correlation with 22.5% of the traits and facets in this data set and seems to support the idea that Grit is not a stand-alone construct.

However, in the Conscientiousness facet level exploratory factor analysis models for Studies 1 through 4, the Perseverance of Effort facet of Grit is either the strongest or second strongest loading facet on the proactive dimension of Conscientiousness, routinely switching places with Determination. Grit's contribution to the structure of Conscientiousness cannot be ignored. Based on this data, it may even be prudent to simply name the proactive, productive, work related facet of Conscientiousness, Grit. In fact, a recent study by Duckworth identifies Grit as a facet of Conscientiousness

(Duckworth et al., 2019). This work offers the potential to confirm that finding but also move a step beyond to suggest it absorb and supplant Productiveness within the BFI-2 framework.

Table 16
Correlations between Grit and Conscientiousness facets

BFI Productiveness	.71
BFI Conscientiousness	.66
HEX Diligence	.66
Goal Focus FoC	.65
Determination	.64
HEX Conscientiousness	.63
BFI Responsibility	.56
C Industriousness	.55
HEX Prudence	.50

General Discussion

Grit

Two main conclusions can be drawn about Grit. First, Grit improves the understanding of proactive aspects of Conscientiousness within these samples. It remains unclear if the Grit measure, as published, should actually supplant current items that make up facets associated with productivity or industriousness or if the measure should be absorbed into established measures. Second, there does not seem to be ample evidence that Grit should be considered a unique, standalone measure. Correlations with BFI-2 Productiveness, which commonly exceeded r = .70, as well as correlations with BFI-2 trait Conscientiousness suggest noteworthy overlap. This suggests that Grit is not a

wholly unique construct on its own but that it is a vital piece of the Conscientiousness framework.

At face value, these conclusions make logical sense. Conscientiousness is commonly described as individual differences in achievement orientation following social norms and rules (Roberts et al., 2009). Grit is described as a passion and perseverance for long term goals (Duckworth et al., 2007). By definition, these two constructs should be closely related overlapping in their efforts to capture focused goal pursuit. This project allowed for and expected this type of overlap which is why the results proved unique and conclusions about Grit being best represented as a proactive facet of Conscientiousness were drawn.

Facets of Control

The items that comprise the FoC capture distinct aspects of Self-Control. Consisting of Goal Focus, Impulse Control and Undistractibility, this measure addresses individual differences in how people experience distractions and impulses. Research currently addresses gaps in the understanding of effortful Self-Control (Milyavskaya & Inzlicht, 2017), how Self-Control may be deployed (Nielsen et al., 2019) and even failures of Self-Control (Baumeister, 2003), but this work asks an antecedent question to all of these psychological phenomena. The measure proposed and tested here focuses more on the experience and impact of impulses. In essence, these impulse experiences are created by situations where Self-Control is required and the FoC appears to identify individual differences in the awareness of distracting impulses.

The issue with first drawing conclusions about the deployment, and certainly failures, of self-control tactics misses this important distinction. Does a person need all or nothing self-control if their responses to distracting impulses are muted or less intense when compared to another person? If people experience impulses differently, and it certainly appears they do, general deployment strategies and failures may be far too simplistic. An important study by Milyavskaya and Inzlicht (2017) argues that the presence of temptation is more important than effortful self-control in predicting goal attainment. This becomes an even more vital finding when considering that some people are less sensitive to recognizing temptations and distractions at all. Milyavskaya et al. (2019) calls for the end of self-control as an umbrella term, arguing for more dimensions within different aspects of self-control but should an amount or demand or intensity dimension be considered? Consider a professional work scenario where two people are required to accomplish an identical task. Add further to this scenario that a distraction of equal interest between these two theoretical people occurs. One of these people potentially requires very little effort, if any effort at all to ignore the distraction and carry on in their task while the other must wage an inner war with themselves to stay on task. In this case, self-control is a multi-dimensional and individualized response incorporating a considerable number of choices about the strength and direction with which to deploy self-control strategies. The FoC appears to adequately assess the individual differences associated with the perceived strength of distracting impulses.

Structure of Conscientiousness

Over four studies that include both university undergraduate samples and a community sample, Conscientiousness appears to have a similar structure consisting of a proactive facet described by Grit/Determination/Productiveness, a very clear and robust facet of Order and a new inhibitory facet of Self-Control/Impulse Control. Order is clear and regardless the total scale construction given to each sample in this work, an Order factor was present. In each study, Order produced the strongest and most closely grouped factor loadings. Inarguably, Order is essential to the facet structure of Conscientiousness.

The proactive facet of Conscientiousness does not receive significant reimagining here as nearly all personality measures include some aspect of effort and achievement orientation in their definitions of Conscientiousness. Productiveness from the BFI-2, Diligence from the HEXACO and Industriousness from the Chernyshenko all seem to identify the importance of proactive effort as a hallmark of Conscientiousness. However, by including the Grit and Determination scales, the dimension measures a more exact phenomenon. Productiveness is defined as work ethic and persistence while pursuing goals (Soto & John, 2017). By incorporating Grit and Determination, an amount of passion is added to proactive Conscientiousness thus improving and expanding on the facet while preserving the most core established elements.

The Goal Focus facet from the FoC also consistently loaded on this dimension. This was not entirely intended but also not surprising either. The Goal Focus facet was dominated by two types of items. First, items like “Even my own doubts don’t seem to deter me from pursuing my goals” and “when I choose to pursue a goal, little can deter

me" identify differences in rigorous focus on goal pursuits. Second, items like "pursuing my goals often feels automatic, requiring little effort" suggests an ease to staying on task. By including this ease and automaticity, the proactive aspect of Conscientiousness preserves the features of productiveness but adds passion, focus and ease for a more complete definition.

By far, the most distinct addition to the structure of Conscientiousness made here is the introduction of Self-Control, and more specifically impulse control, as a stable facet. Big Five Personality scales, especially the modern ones, have been devoid of Self-Control. The NEO-PI-3 includes a broad facet of Self-Discipline but during the development of the BFI-2, this was most closely aligned with Productiveness (Soto & John, 2017). Green et al. (2016) suggest a slightly less broad Self-Control facet in the Chernyshenko Conscientiousness scale but it was not tested for situation within the global five factor models. It did, however, contribute to the inhibitory dimension of Conscientiousness that included the Impulse Control facet of the FoC along with the HEXACO Prudence facet.

This improvement and incorporation of Self-Control as the inhibitory dimension of Conscientiousness is both exceedingly important and slightly incomplete. Both in lay terms and empirically, Self-Control was conspicuously absent and entirely necessary within the established literature. That has been addressed here. What it replaces or perhaps better stated, renders unimportant or uninterpretable, is Responsibility. Responsibility is defined as a commitment to meeting duties and obligations (Soto & John, 2017) and embodies the prosocial, norm and rule following, aspects of

Conscientiousness. This new structure tends to suggest that prosocial behavior is independent of Conscientiousness which the founders, contemporary and modern, would strongly oppose. Rampant, cold, focused adherence to achievement at any cost, fails to completely capture what it means to be Conscientious.

Future Directions

While the conclusions drawn here are important to the psychometric understanding of personality traits, outcome variables are noticeably absent. However, outcome variables are exceedingly important. Specifically related to Conscientiousness, self-selected personal goals serve as an exquisite example of an outcome. Beyond just stating goals, the assessment and prediction of goal content, goal pursuit, goal conflict and goal attainment should all be considered possible outcomes of this work. This will best be captured with short term longitudinal studies incorporating self-report, ecological momentary assessment and the careful tracking of goal completion. There is every indication that this new model of Conscientiousness should more accurately predict these outcomes.

There are also clear areas for improvement within the FoC. Items associated with Goal Focus will require refinement as they begin to border on an overlap with Productiveness and Industriousness. There is also opportunity to include new items which examine ideas related to situation selection as a form of initiatory self-control. These items would ask about a participant's capacity to predict distracting situations and actively avoid them before they become distractions. There is some evidence that

situation selection may be an important Self-Control strategy, worthy of deeper exploration (Milyavskaya et al., 2020).

Conclusion

Conscientiousness has vital predictive capacities associated with a fulfilling life including job performance (Barrick & Mount, 1991), academic achievement (Wagerman & Funder, 2007), relationship satisfaction (Malouff et al., 2010) and a host of additional consequential outcomes (Ozer & Benet-Martinez, 2006). To some degree, to improve the structure of Conscientiousness is to improve the understanding of how to be successful. Finer nuance and more accurate measurement of such an important trait has limitless benefits for identifying common behaviors that span increases in the chance of an individual being successful in life all the way to smoking cessation. It is with great honor that this project contributes to such noble endeavors.

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Appendix A

Research Assistant Instructions for Facets of Control Scale Development

I would like to get your input on the items I am developing for a measure to gain insight into an element of Grit. Currently, Grit is defined as a "perseverance of effort" and a "passion for long term goals" which seems fairly complete, yet the current established measure is not producing the most exquisite results or predictions. In our estimation, Grit is more of a tendency to narrow goal focus, an adaptive obsessiveness and an extreme type of conscientiousness that hyper focuses on achievement. We hypothesize that one contributing element to Grit is a reduced sensitivity to distracting impulses, temptations and peripheral goal pursuits, which is what we hope to tap into with these items. This tendency not to be deterred from your goals by distractions is what we are suggesting should be called "Impulse Awareness." The items are based on this concept.

I would like you to read through these items and rate them in the following ways on a 1-5 scale where 1 is low and 5 is high. This will be the same for the first 4 ratings with 5 and 6 being independent of the ratings scale:

1. Relatedness – How related do you feel the item is to the construct of Impulse Awareness?
2. Low Dimension – How do you feel someone would rate this question if they were low on Impulse Awareness? Please put yourself in their mindset. This is someone who is a reward seeker, who changes goals and interests often, and most likely skips around from goal to goal without completing many of them.
3. High Dimension – How do you feel someone would rate this question if they were high on Impulse Awareness? Please put yourself in their mindset. This is the gritty person. Occupationally and academically tenacious. Someone who perseveres and has passion for their long-term goals. There is an effortlessness to their pursuits, and they seem to complete goals frequently.
4. Clarity – How clear is this question? Does it make sense and are you easily able to understand what it is asking?
5. Grouping – For this task, I would ask you to assign a number to questions that are very similar. For instance, if you feel two questions are asking nearly exactly the same thing you would write a "1" for both. If you found two more questions that were exactly the same, you would put a "2" in both. And so on.
6. Re-written suggestion – For this column, if you have a suggestion for a way to improve the question, perhaps to improve clarity or remove and replace a term you think is too technical, here is your chance.

Appendix B

Facets of Self Control Version 1 (1-7)

Scale: 1: Strongly disagree, 2: Moderately disagree, 3: Slightly disagree, 4: Neither agree nor disagree, 5: Slightly agree, 6: Moderately agree, 7: Strongly agree

Instructions: People have goals of all kinds, from planning a meal to getting into medical school. As you answer these questions please think of real goals you have pursued or are pursuing.

1. I am efficient at making progress towards my goals.
2. I am rarely distracted from my goals.
3. When I choose to pursue a goal, little can deter my focus.
4. I often focus on my goals and become unaware of my surroundings.
5. I pursue my goals and ignore distractions.
6. I concentrate easily.
7. I often feel compelled to say things without thinking.
8. I often act on impulse.
9. I often ignore my goals and act on the spur of the moment.
10. I carefully plan how to attain my goals.
11. During the pursuit of my goals, thoughts about social interactions rarely cross my mind.
12. During the pursuit of my goals, thoughts about other activities rarely cross my mind.
13. I do not miss my goal-related commitments for any reason.
14. Thoughts about missing my goal related commitments never crosses my mind.
15. Criticism does not deter me from pursuing my goals.
16. When I want to pursue something, I usually go all-out to get it.
17. I sometimes start working on new goals without thinking about how I will attain them.
18. I spend most of my time pursuing one goal until it is completed.
19. I spend most of my time pursuing a few goals until they are completed.
20. I tend to devote large amounts of time to attaining my goals.
21. Nearly all of my activities are focused on attaining my goals.
22. Once I have chosen a goal, almost nothing can distract me from achieving it.
23. I have accomplished goals that took more than a year to achieve.
24. It is easy for me to develop productive routines.
25. I look for the most effective strategy to accomplish my goals.

Appendix C

Facets of Self Control Version 2 (1-7)

Scale: 1: Strongly disagree, 2: Moderately disagree, 3: Slightly disagree, 4: Neither agree nor disagree, 5: Slightly agree, 6: Moderately agree, 7: Strongly agree

Instructions: People have goals of all kinds, from planning a meal to getting into medical school. As you answer these questions please think of real goals you have pursued or are pursuing.

1. When I choose to pursue a goal, little can deter me.
2. When I work at getting something done, I often become unaware of my surroundings.
3. When I am working on something important, thoughts about social interactions rarely cross my mind.
4. When pursuing a goal, thoughts about other activities rarely cross my mind.
5. I can comfortably read a book in a noisy environment.
6. Even my own doubts don't seem to deter me from pursuing my goals.
7. I can easily focus on my long-term goals and not notice distractions along the way.
8. I don't seem to notice distractions.
9. Distracting impulses rarely occur to me.
10. I rarely act on impulse.
11. I can get work done, even at a party.
12. I seem harder to distract than my peers.
13. I rarely act on the spur of the moment.
14. I don't really need to plan to work on my goals, I just do it.
15. I never question whether I can attain my goals.
16. I feel little concern for the opinion of others when I pursue my goals.
17. Pursuing my goals often feels automatic, requiring little effort.
18. It is effortless for me to ignore distractions.
19. When I am working on something, I usually keep working until I choose to stop.

Appendix D

FoC Items Version 3 (1-7)

Scale: 1: Strongly disagree, 2: Moderately disagree, 3: Slightly disagree, 4: Neither agree nor disagree, 5: Slightly agree, 6: Moderately agree, 7: Strongly agree

Instructions: People have goals of all kinds, from planning a meal to getting into medical school. As you answer these questions please think of how you approach real goals you have pursued or are pursuing.

1. I seem harder to distract than my peers. 3A
2. I often act on impulse. 2B
3. I don't seem to notice distractions.
4. When I am working on something important, thoughts about social interactions rarely cross my mind.
5. I don't really need to plan to work on my goals, I just do it.
6. When I work at getting something done, I often become unaware of my surroundings.
7. When I choose to pursue a goal, little can deter me. 2
8. Distracting impulses rarely occur to me. 1A
9. It is effortless for me to ignore distractions.
10. My actions are usually based on logic rather than impulse.
11. Even my own doubts don't seem to deter me from pursuing my goals. 1
12. I can stay focused on working even when I am not feeling well.
13. I rarely act on the spur of the moment.
14. I cannot work when I am tired. 4B
15. If I am getting things done, I will stay at it even if I get tired or hungry.
16. I feel little concern for the opinion of others when I pursue my goals.
17. I can get work done, even at a party.
18. I seem easier to distract than my peers. 3B
19. I can comfortably read a book in a noisy environment.
20. Distracting impulses often occur to me. 1B
21. When pursuing a goal, thoughts about other activities rarely cross my mind.
22. I never question whether I can attain my goals.
23. I can work even when I am tired. 4A
24. I enjoy many activities but like to stay focused on getting things done. 3
25. When I am working on something, I usually keep working until I choose to stop.
26. I can easily focus on my long-term goals and not notice distractions along the way. 4
27. I often turn down chances to be with friends so I can work to achieve my goals.
28. I rarely act on impulse. 2A
29. Pursuing my goals often feels automatic, requiring little effort.
30. I would rather do what is wise than what is fun.

Appendix E

Determination Scale – Hoyle (1-5)

Scale: 1: Not like me at all, 2: Not much like me, 3: Somewhat like me, 4: Mostly like me, 5: Very much like me

Instructions: Here are a number of statements that may or may not apply to you. There are no right or wrong answers, so just answer honestly, considering how you compare to most people.

1. Even significant setbacks do not cause me to give up on achieving my long-term goals.
2. Even if my attempts to pursue an important goal are not working, I keep trying and never give up.
3. I refuse to abandon my valued goals, even when others tell me achieving them seems unlikely.
4. I am willing to do whatever it takes to realize my dreams.
5. It is rare for me to lose interest in the major goals I have set for myself. 1A
6. No matter their difficulty, I don't lose track of things that I most want to achieve in life.
7. Not even major setbacks keep me from pushing forward toward the goals that matter most to me.
8. Even when pursuit of an important goal causes me to lose ground in other pursuits, I stay with it.
9. Even when it seems that the approach I am taking in pursuit of a valued goal is becoming less effective, I keep pushing forward.
10. The time and energy I give to pursuit of my major life goals is not affected by short-term successes and failures.
11. I sometimes lose interest in the major goals I have set for myself. 1B

Appendix F

Chernyshenko Conscientiousness Scale – (1-5)

Scale: 1: Disagree Strongly, 2: Disagree Somewhat, 3: Agree Somewhat, 4: Agree Strongly
Instructions: Please rate how much you agree with each of the following sentences. Rate yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you are generally or typically.

1. Being neat is not exactly my strength. *
2. Organization is a key component of most things I do.
3. I need a neat environment in order to work well. **1A**
4. I become annoyed when things around me are disorganized.
5. For me, being organized is unimportant. *
6. Half of the time I do not put things in their proper place. *
7. Most of the time my room is in complete disarray. *
8. Every item in my room and on my desk has its own designated place.
9. I frequently forget to put things back in their proper place. *
10. I hate when people are sloppy.
11. If I could get away with it, I would not pay taxes. *
12. I would lie without hesitation if it serves my purpose. *
13. I could be insincere and dishonest if the situation required me to do so. *
14. If I find money laying around, I'll keep it to myself. *
15. If a cashier forgot to charge me for an item, I would tell him/her.
16. I would rather get a bad grade than copy someone else's homework and turn it in as my own.
17. It bothers me when people cheat on their taxes.
18. If I accidentally scratched a parked car, I would try to find the owner to pay for the repairs.
19. I firmly believe that under no circumstances it is okay to lie.
20. The people who know me best would say that I am honest.
21. I have the highest respect for authorities and assist them whenever I can.
22. People respect authority more than they should. *
23. Even if I knew how to get around the rules without breaking them, I would not do it.
24. I believe that people should be allowed to take drugs, as long as it doesn't affect others. *
25. I support long-established rules and traditions.
26. People who resist authority should be severely punished.
27. When I was in school, I used to break rules quite regularly. *
28. In my opinion, all laws should be strictly enforced.
29. In my opinion, censorship slows down the progress. *
30. When working with others I am the one who makes sure that rules are observed.

31. I often rush into action without thinking about potential consequences. *
32. I rarely jump into something without first thinking about it.
33. I am known to make quick, hot-headed decisions. *
34. I do not take unnecessary risks.
35. I am easily talked into doing silly things. *
36. My friends say I am unpredictable. *
37. I get into trouble because I act on impulses rather than on thoughts. *
38. I am careful with what I say to others.
39. I dislike being around impulsive people.
40. Even under time pressure, I would rather take my time to think about my answer than to say the first thing that comes to mind.
41. I carry out my obligations to the best of my ability.
42. I often feel responsible for making sure that all group project assignments are completed.
43. I go out of my way to keep my promises.
44. Sometimes it is too much of a bother to do exactly what is promised. *
45. I would gladly spend some of my leisure time trying to improve my community.
46. If I am running late to an appointment, I may decide not to go at all. *
47. I am usually not the most responsible group member, but I will not shirk on my duties either. *
48. If I am running late, I try to call ahead to notify those who are waiting for me.
49. When I make mistakes, I often blame others.
50. I have a reputation for being late for almost every meeting or event. *
51. I have high standards and work toward them.
52. I go above and beyond of what is required. **2A**
53. I do not work as hard as the majority of people around me. *
54. I invest little effort into my work. *
55. I demand the highest quality in everything I do.
56. I try to be the best at anything I do.
57. I make every effort to do more than what is expected of me.
58. I do what is required, but rarely anything more. *
59. Setting goals and achieving them is not very important to me. *
60. Getting average grades is enough for me. *
61. I do not need a neat environment in order to work well. **1B**
62. I don't usually go above and beyond of what is required. **2B**