**Trait Self-Control, Inhibition, and Executive Functions:**

**Rethinking Some Traditional Assumptions**

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**Abstract**

This paper draws on work in the sciences of the mind to cast doubt on some assumptions that have often been made in the study of self-control. Contra a long, Aristotelian tradition, recent evidence suggests that highly self-controlled individuals do not have a trait very similar to continence: they experience relatively few desires that conflict with their evaluative judgments and are not especially good at directly and effortfully inhibiting such desires. Similarly, several recent studies have failed to support the view that self-control capacities are constituted, at least in part, by excellent inhibitory executive function ability. I propose an alternative “indirect harmony” hypothesis about trait self-control. According to this hypothesis, if there is a character trait of being highly self-controlled, it consists in motivational harmony within the mind that is brought about through the effective use of indirect resistance strategies that prevent occurrent motivational conflict from emerging in the first place. If this hypothesis is correct, high trait self-control in actual humans does not fit neatly into the traditional categories of either continence or temperance. I conclude by drawing out several implications this hypothesis has for future research on trait self-control and its relation to executive functions.

In her commentary on an influential 2011 study by Terrie Moffitt, Avshalom Caspi and colleagues, Angela Duckworth claims that the “common thread running through diverse conceptualizations of self-control is the idea of effortful regulation of the self by the self” ([1], p. 2639).[[1]](#footnote-2) The Moffitt et al. study [3], on which Duckworth is commenting, focuses on self-control as a personality trait, which remains fairly stable throughout much of one’s lifespan, and which is correlated with a wide variety of life outcomes.[[2]](#footnote-3) For example, individuals with higher self-control tend to have better health, greater wealth, lower levels of criminal behavior, and feel happier in the moment, than individuals with lower self-control—even when controlling for potentially confounding variables such as socio-economic status [3-8].

The idea that self-control is a beneficial personality trait traces back (in Western thought) to the ancient Greek notion of *enkrateia* (literally, ‘self-mastery’ or ‘having power over oneself,’ often translated as ‘continence’). Mele and many other philosophers who work on self-control follow Aristotle in identifying trait self-control with *enkrateia* and distinguishing it from another trait concerned with the intelligent management of desire: *sophrosyne* (temperance or moderation) ([9], 1117b24-1118b7; Book 7, esp. 1151b31-1152a7).[[3]](#footnote-4) On a broadly Aristotelian view, both continent and temperate individuals act in accordance with their evaluative judgments (i.e., their judgments about what they should do or what is in their best interest), but continent individuals do so by successfully struggling against desires that conflict with these “better” judgments, while temperate individuals tend not have such conflicting desires in the first place.**[[4]](#footnote-5)**

In this Aristotelian framework, the idea that self-controlled individuals are good at *directly* resisting (i.e., inhibiting or overriding) conflicting desires is an essential part of the “idea of effortful regulation” (the “common thread” that Duckworth identifies in diverse accounts of self-control).[[5]](#footnote-6) Direct resistance is “what we have in mind when we speak, in ordinary parlance, of someone’s resisting temptation by sheer effort of will” ([11], p.26; cf. [13]).[[6]](#footnote-7) In other words, direct resistance is what Duckworth, Gendler, and Gross call “response modulation”: “the most straightforward” of self-control strategies, in which individuals “voluntarily suppress undesirable impulses [i.e., impulses that conflict with their evaluative judgments] or amplify desirable ones … [i]n the heat of the moment” ([14], p.42). So, on an Aristotelian model of trait self-control, self-controlled individuals are “strong willed” (i.e., excellent at directly resisting conflicting desires), while those who have the opposite trait, *akrasia*, are “weak willed.”

The trait of being self-controlled—understood in Aristotelian terms as being continent and thus having strong willpower—can be thought of as falling under a broader notion of self-control, an “umbrella constructthat bridges concepts and measurements from different disciplines” ([3], p.2693). As Moffitt et al. remark, another specific notion that falls under this broad umbrella of self-control is *executive function* (EF, also known as ‘cognitive control’) (ibid.). EF is most often a subject of investigation in cognitive psychology and neuroscience, and it is commonly thought that EF capacities “are important to study because they are a core component of self-control or self-regulation ability” ([15], p. 8; see [16] for an overview). Three EFs have been widely studied and are often identified as “core” EFs—*inhibition* (deliberate overriding of automatic or prepotent responses), working memory *updating* (constant monitoring and rapid addition or deletion of working memory contents), and set *shifting* (also called task *switching*) (switching flexibly between tasks or mental sets)([16], p.136; see also [15], p.9). Researchers disagree about the relations between these three EFs, how they give rise to more complex EFs like problem solving and planning, and how exactly they are related to trait self-control.[[7]](#footnote-8) However, a dominant view, consistent with a traditional, Aristotelian model, is that high trait self-control consists, at least in part, in having above average *inhibitory* EF capacities. Indeed, the identification of self-control ability with inhibitory EF is so natural that Adele Diamond, in her review of executive functions, simply *defines* one part of “inhibitory control,” i.e., “response inhibition,” *as* “self-control—resisting temptations and resisting acting impulsively” ([16], p.135).

Pulling all this together, we can identify three key components of a traditional view of trait self-control, which I will refer to as the

*high-trait-self-control-as-continence* thesis: high trait self-control requires (a) *below average* (or perhaps average) conformity of one’s desires to one’s evaluative assessments or judgments (i.e., below average or average “assessment-desire conformity”),[[8]](#footnote-9) (b) *above average* ability to *directly* *resist* conflicting desires, and (c) *above average inhibitory* EF capacities, which, at least in part, underlie (b).[[9]](#footnote-10)

Either individually or together, the components of *high-trait-self-control-as-continence* pervade much historical and contemporary work on self-control in both philosophy and the sciences of the mind. For example, as remarked above (in note 3), (a) and (b) are explicitly part of Al Mele’s account of self-control, which has been called “by far the most discussed and developed [account] in the philosophical literature” ([19], p.733). Further, (b) and (c) are evident in Tangney, Baumeister, and Boone’s paper [5] that introduced one of the most widely used measures of trait self-control (the Self-Control Scale).[[10]](#footnote-11) They write that “[c]entral to our concept of self-control was the ability to override or change one’s inner responses, as well as to interrupt undesired behavioral tendencies (such as impulses) and refrain from acting on them” ([5], p.274). In particular, Tangney et al. emphasize exercises of direct resistance, like “forcing oneself to concentrate, … , restraining undesirable impulses, and achieving optimal performance (e.g., by making oneself persist)” (ibid.). Baumeister and colleagues have also advanced the highly influential “strength” or “resource” model of self-control, which, when taken as a model of trait self-control, includes (b) and (c) in the idea that self-controlled individuals have a strong self-control “muscle” that enables them to inhibit or override impulses and that is depleted after extensive use [2].[[11]](#footnote-12)

In this paper, I discuss recent evidence that is inconsistent with the *high-trait-self-control-as-continence* thesis but that supports an alternative, schematic hypothesis about self-control *if* one continues to believe that it is a beneficial character trait concerned with the intelligent management of desire.[[12]](#footnote-13) In brief, if being self-controlled is a character trait, then it isintermediate between traditional Aristotelian conceptions of continence and temperance.[[13]](#footnote-14) Far from being excellent at directly resisting conflicting desires, self-controlled individuals seem to exhibit the kind of motivational harmony that has traditionally been taken to be distinctive of temperance (contra (a) and (b) above). Yet, self-controlled individuals achieve this motivational harmony by employing *indirect* resistance strategies that usually prevent occurrent conflicting desires from arising in the first place—strategies that have traditionally been taken to be distinctive ofcontinence. Unlike the traditional picture of continent individuals (and contra (c)), though, self-controlled people are not particularly good as *inhibiting* conflicting desires, but rather seem to have excellent set *shifting* EF capacities, which plausibly partially underlie their effective use of indirect strategies to achieve motivational harmony. Thus, self-controlled individuals are good at *indirectly* achieving *harmony* between their occurrent desires and their evaluative judgments; they are not particularly good at resisting conflicting desires but rather at preventing conflicting desires from arising in the first place.

This *indirect harmony* hypothesis is in the tradition of “integrative” models of self-control like Fujita, Carnevale, and Trope’s, which maintain that successful self-control involves resolving a “coordination problem” via “negotiation” between aspects of the mind ([24], pp.285, 293).[[14]](#footnote-15) This paper contributes to this tradition in two main ways. First, I identify (in Section 2) recent studies in cognitive psychology that have not yet widely been brought to bear on debates about self-control in philosophy and that support integrative models, in general, and the indirect harmony hypothesis, in particular. Second, I clarify the implications that integrative models can have for the traditional *high-trait-self-control-as-continence* thesis. As a model of traitself-control, an integrative model need not merely “augment” traditional views that endorse *high-trait-self-control-as-continence* (cf. [24], pp.290, 294). For, the indirect harmony hypothesis does not claim that trait self-control is “more” than being excellent at “effortfully inhibiting” impulses (cf. [13]). Rather, it proposes that trait self-control does not involve excellent effortful (direct or inhibitory) resistance ability *at all*.[[15]](#footnote-16) The second goal, in turn, motivates further work in line with the first: abandoning traditional conceptions of self-control as requiring strong willpower and inhibitory EF opens up conceptual space for rethinking the neurocognitive bases of trait self-control (if indeed there is such a trait), focusing, e.g., on set-shifting and goal maintenance rather than “rigid,” direct inhibition. (More on this in Section 3.)

In this paper, I will not defend the claim that being self-controlled is a character trait (the antecedent of my schematic hypothesis)—although (in Section 3) I rebut some arguments that self-control is *not* a character trait (or at least not a “paradigmatic” character trait). My main targets are the many views in philosophy, personality psychology, and social-developmental disciplines that at least tacitly assume that self-control is a character trait (and that this trait is continence).[[16]](#footnote-17) If the hypothesis proposed in this paper is true, the nature of this character trait is much different than the dominant picture offered by *trait-self-control-as-continence*. After briefly reviewing evidence against parts (a) and (b) of *high-trait-self-control-as-continence* from personality and social psychology (Section 1), I turn to the unity/diversity model of EF and to evidence from cognitive psychology against part (c) (Section 2). Then, in Section 3, I rebut an argument that self-control is not a character trait and briefly mention some of the implications the indirect harmony hypothesis has for future research on self-control and executive function.

***1. Trait Self-Control and Direct vs. Indirect Resistance Strategies***

In addition to *direct* resistance, discussed above, self-controlled individuals may also use *indirect* strategies of resistance, which include “situation-selection,” “intentionally choosing to be in situations that favor [acting in accordance with one’s evaluative judgments]” (e.g., going to the library when one judges that one should study); “situation-modification,” “purposefully changing our circumstances” to avoid acting on conflicting desires (e.g., Odysseus lashing himself to the mast to avoid acting in response to the sirens’ song); “attentional-deployment,” “direct[ing] our focus to features of the situation that facilitate, rather than undermine” acting in accordance with one’s evaluative judgments (e.g., looking away from a chocolate bar); and “cognitive change,” thinking about the situation differently, such as construing temptations in high-level, abstract terms. (For this taxonomy, see [14], pp.40-2; see also [12, 13, pp.201, 206, [9], p.26.)

 *High-trait-self-control-as-continence* claims that self-controlled individuals are better than average atdirectly resisting conflicting desires((b) above)**.** However, as Levy has discussed in a recent paper [12], there is not strong evidence that self-controlled individuals are especially good at directlyresisting conflicting desires, and there is some evidence against this claim. Levy focuses on a study by Imhoff, Schmidt, and Gerstenberg [28] that suggests that self-controlled individuals are worse at directly resisting temptations when they are encountered in an “ego depleted” state and are also not better than average at directly resisting temptations in a non-depleted condition.[[17]](#footnote-18) A more recent study also that found self-controlled individuals “typically engage *less* in the actual execution of [direct] self-control” ([21], pp.68, 73). (See also [22, 30-31].)These studies further support Levy’s conclusion that trait self-control “is not a measure of *direct* self-control. It does not measure the capacity to effortfully resist temptation” ([12], p.201).

A number of studies also suggest that high trait self-control does not satisfy part (a) of *high-trait-self-control-as-continence*. Recent evidence suggests that self-controlled people do not exhibit average or below average assessment-desire conformity. Rather, they seem to have *above* average desire-assessment conformity. Self-controlled people report experiencing *fewer* conflicting desires than average and *fewer* episodes of engaging direct, effortful, inhibitory self-control than average [21, 28, 32-34]. In this respect, high trait self-control (if it is a character trait) satisfies part of the traditional conception of *temperance*. (I return to this point below.)

Both the fact that self-controlled people have above average desire-assessment conformity and are not particularly good at directly resisting conflicting desires can be partially explained by the fact that they *are* better than average at employing *indirect* resistance strategies, such as avoiding environments in which temptations are likely to arise or using various “pre-commitment” strategies that block access to temptations if they are encountered [7, 21, 28 (Study 3), 32, 33, 35].[[18]](#footnote-19) For, self-controlled people seem to achieve greater desire-assessment conformity *by* avoiding (or modifying) situations in which conflicting desires are likely to arise in the first place, and if they experience conflicting desires less often, then will have had less opportunity to practice directly resisting them (and less need to do so) (see [12], p.203).

In the next section, I turn to the relation between trait self-control and executive function. After explaining the unity/diversity model of EF capacities, I then discuss some studies that provide evidence that high trait self-control does not involve superior inhibitory EF capacities, thereby providing evidence against part (c) of *high-trait-self-control-as-continence*.

***2. Trait Self-Control and Executive Function***

***2.1. The Structure of Executive Function Capacities***

Despite the high degree of theoretical overlap between self-control and executive function (see, e.g., [36]), meta-analyses have revealed surprisingly weak correlations between measures of the two constructs [20]. Among the possible explanations for this are that executive functions are both difficult to adequately conceptualize and hard to measure. One source of measurement difficulty is that any behavioral task that purports to measure some EF also draws on other psychological capacities (so-called “task impurity”, see, e.g., [37]).[[19]](#footnote-20) One way of coping with task impurity is to aggregate results on multiple kinds of task that require different non-EF processes but all tap the same EF ability and then statistically extract the variance that is common to performance on these different tasks, thereby separating the EF-related from the non-EF-related individual differences—so-called “latent variable” analysis (e.g., [37]).[[20]](#footnote-21)

 One influential tradition takes there to be both *unity* and *diversity* among executive functions: individual executive functions likely draw on some common underlying ability or abilities (unity) while also being separable or dissociable, suggesting distinct underlying mechanisms (diversity) [37-38]. The unity and diversity among EFs can be represented in different ways. In traditional multiple regression models (such as exploratory or confirmatory factor analysis), each EF variable (inhibition, updating, and shifting) is represented as a single ability, and different tasks are hypothesized to be good measures of these abilities. In this kind of model,strong positive correlations between the EF variables represent their unity, and the fact that these correlations are less than 1 represents their diversity (that they are partially independent or separable).

By contrast, a “bifactor” or “nested factors” model represents the unity and diversity among EFs more directly in the latent variables themselves rather than in the correlations between these variables. That is, a single, Common EF factor is taken to load directly on *all* EF tasks, representing the unity of EFs. Then, “once the correlations [between performance on individual tasks] due to the Common EF factor are removed,” any EF factors specific to particular kinds of task can be extracted “from the remaining correlations among [these] tasks” ([17], p.188; see also [15]). Thus, “[e]ach EF ability (e.g., updating) can be decomposed into what is common across all three EFs, or unity [Common EF], and what is unique to that particular ability, or diversity (e.g., updating-specific ability)” ([15], p.10). This approach may more cleanly map onto underlying cognitive and neurophysiological processes than confirmatory factor analyses because of the way it represents unity and diversity among EF abilities (ibid., pp.9-10).

Importantly, in Friedman and Miyake’s influential bifactor “unity/diversity model,” once the variance associated with Common EF is accounted for, there are no remaining correlations between inhibition tasks that would warrant creating a separate inhibition-specific factor ([15], p.10). Put another way, “the inhibition factor happens to correlate virtually perfectly with common EF, leaving no inhibition-specific variance” (ibid.). So, the underlying capacities measured by inhibition tasks seem to be common to all EF measures, while some specific EF tasks assess updating-specific and shifting-specific capacities in addition to Common EF.[[21]](#footnote-22)

***2.2. Trait Self-Control, Inhibition, and Set Shifting***

If high trait self-control involved an excellent ability to directly and effortfully resist conflicting desires, then one would expect there to be a positive correlation between trait self-control and Common EF (which, again, corresponds to direct, inhibitory capacities in the unity/diversity model of executive function) and to EF tasks that are taken to load on the Common EF (but not the shifting-specific or updating-specific factors) such as Stroop, Go/NoGo, and Flanker tasks. However, several recent studies have failed to find any significant correlations between trait self-control and Common (or inhibition-related) EF.

For example, Saunders et al. [39] explored the association between scores on the Self-Control Scale and performance on Stroop and Flanker tasks, using Bayesian correlational analyses and a meta-analysis of all five of their individual studies, which suggested “little-to-no relationship” between self-reported self-control ability and inhibition-related EF capacity. As they write, “[o]ur results suggest that the Stroop and flanker tasks do not reflect the broader individual difference construct that is reflected in self-report scales [of self-control]” (ibid., p.11). Similarly, Necka et al. [40] used structural equation modelling to explore the relationships between trait self-control and executive function, finding that “the latent variables representing [self-control] and the latent variable representing EFs did not show any relationship” ([40], p.1).[[22]](#footnote-23)

Two recent studies also support the idea that there is no significant correlation between trait self-control and inhibitory EF capacity [45-46]. However, they both offer some hints that there may be a fairly small, but significant, correlation between trait self-control and *shifting-specific* EF ability. First, in a study on how trait self-control and executive function may affect individuals’ translation of their intentions to engage in physical activity into actual behavior, Pfeffer and Strobach [45] found that “[s]elf-report trait self-control and executive functions were almost not correlated” (ibid, p.284). But they did find a significant, but fairly small (*r* = -.19, *p* < .05), correlation between trait self-control and one measure of shifting ability, with higher trait self-control being “associated with better performance (decreased switch effects) in the task-cueing paradigm” (ibid., p.285). Second, Fleming, Heintzelman, and Bartholow [46] examined the relationship between conscientiousness and EF ability.[[23]](#footnote-24) Consistent with the above studies, they found no correlation between conscientiousness and Common EF, but they did find a fairly small, but significant, correlation (*r =* .18, p < .05) between conscientiousness and shifting-specific EF ability. The authors take these results to support the idea that conscientious people are not especially good at inhibiting impulses ([46], p.357). Thus, they urge that future work on conscientiousness (and presumably the closely related construct of trait self-control (see note 2)) focus on “those aspects of the trait dealing with cognitive agility and rule learning and less on characterizations of this trait as synonymous with [direct, inhibitory] impulse control” (ibid.).[[24]](#footnote-25)

 Taken together, the results from the studies discussed in this section provide against part (c) of *high-trait-self-control-as-continence*. In the next section, I discuss the indirect harmony hypothesisabout the nature of trait self-control, rebut arguments that self-control is not a character trait at all, and discuss some implications for future work on self-control and executive function.

***3. The Indirect Harmony Hypothesis and Self-Control as a Character Trait***

I have reviewed recent evidence that high trait self-control does not consist in having below average assessment-desire conformity nor in above average ability to directly resist conflicting desires. Further, self-controlled people do not have above average inhibitory EF capacities. In each of these ways, high trait self-control differs from the traditional conception of continence; all three parts of the influential *high-trait-self-control-as-continence* thesis seem to be false.

In its place, I suggest that the *indirect harmony* hypothesis about trait self-control be taken seriously. According to this hypothesis, instead of being good at directly resisting occurrent motivational conflict, self-controlled individuals are particularly good at *avoiding* such conflict; like temperate individuals, they are characterized by internal motivational harmony. That is, rather than requiring active conflict between parts of the mind (as required by part (a) of *high-trait-self-control-as-continence*) which is subsequently resolved via direct resistance (per part (b)), high trait self-control involves occurrent motivational *unity*, in which (any) occurrent motivational signals from different parts of the mind are in agreement.[[25]](#footnote-26) So, high trait self-control seems to involve a kind of *indirect harmony* that falls between the traditional conceptions of continence and temperance; it is similar to temperance (and differs from continence) in involving above average harmony between an individual’s appetitive desires and their assessment of the value of the objects of those desires, but it is similar to continence (and differs from temperance) in that the motivational harmony of the self-controlled person (i.e., their lack of conflicting desires) is not *itself* a stable, cross-situationally robust feature of their psychology. Rather, their motivational harmony is a product of the indirect resistance strategies discussed above, and the effective use of these indirect strategies is plausibly constituted, in part, by excellent set shifting EF ability.[[26]](#footnote-27)

Levy argues that some of the studies I discuss in Section 1 support the view that self-control depends “significantly on nonproprietary skills,” which, he claims, “raises important questions about whether it is appropriate to categorize self-control as a character trait” *at all* ([12], p.207).[[27]](#footnote-28) Levy’s most compelling argument against treating self-control as a character trait relies on the idea that “when we talk about character traits, we seem to have in mind internal states of the person with a *direct* relationship to the behavior by reference to which we categorize it” (ibid., p.204, italics in original). He then suggests that “it’s reasonable to say” that people who score high on measures of trait self-control do not have such internal states (ibid.).

It is worth quoting a large chunk of Levy’s argument for this claim not only because this will enable me to show where I think it goes wrong but also because the quotation actually provides further support for the indirect harmony hypothesis:

Consider tracking … a person [who scores high on measures of trait self-control] in his or her daily activities. We would probably rarely see this person doing anything we would describe as “exercising self-control.” Indeed, this person may rarely engage in anything *he or she* would describe as exercising self-control. Perhaps this person deliberately engages in actions designed to limit his or her future freedom, like setting the timer on a drinks cabinet, but it is at least equally likely he or she does not; that instead his or her pursuit of the indirect strategy is implicit. Perhaps this person buys the smaller tub of ice cream *because that’s the right size*, avoids the bakery on the route home habitually, and so on. Since we would rarely see this person exercising self-control, even indirectly—the [smaller, sooner] rewards the person avoids would never be salient, for us or for him or her—it would be misleading to describe this individual as possessing the character trait “self-control.” ([12], p.204, italics in original)

I accept the claim that Levy makes in the last sentence if we take ‘self-control’ to mean *continence*. This passage as a whole is further fodder for an argument against *high-trait-self-control-as-continence*. However, it is one thing to deny that a person who scores high on measures of trait self-control is continent and another to say that she has *no* character trait concerned with the intelligent management of desire. Levy does not provide a convincing argument for this stronger claim. In order to do that, he needs to show that this individual has no “internal states with a *direct* relationship” to “self-controlled” behavior—i.e., behavior that conforms to her evaluative judgments. Yet the passage quoted above does not bear on whether the relationship between the person’s internal states and her behavior is *direct* or not. Rather, it is concerned with the distinct question of whether she is likely to exercise self-control *implicitly* (effortlessly or habitually), rather than *effortfully*. The fact that someone *implicitly* exercises an operation or strategy does not imply that she has no internal states with a “direct relationship” to her self-controlled behavior. The relationship between this person’s internal states (including, say, a desire to buy the “right-sized” carton) and her ice cream consumption may be just as “direct” as the relationship between a continent person’s internal states (her desire to eat an immoderate amount, which then she suppresses) and her ice cream consumption. The difference is only that the former case does not involve the direct effortfulresistance that is characteristic of continence.

 Further support for this point is provided by the fact that Levy’s passage (perhaps unintended by him) simply describes the respects in which self-controlled individuals are more similar to *temperate* people than to continent ones.[[28]](#footnote-29) In buying the smaller tub of ice cream “*because that’s the right size*,” theself-controlled person would be performing the temperate action for (what a virtue ethicist would say is) the right reason. In exercising the relevant capacities or strategies implicitly, this person is acting in conformity with her evaluative judgments because it has become “second nature”—something that she does wholeheartedly, immediately, and (sometimes) without the need for conscious deliberation (see [22, 33][[29]](#footnote-30)). If anything is a character trait, temperance is (after all, it is a cardinal virtue), and, for as much as Levy says in the above passage, the person he is describing *is* temperate.[[30]](#footnote-31) In short, this part of Levy’s argument fails because he assumes that if self-control were a character trait it would be continence, and thus falsely concludes that any “direct relationship” between a self-controlled person’s internal states and her behavior would have to be direct in another way, i.e., involve *direct resistance*. However, if we abandon *high-trait-self-control-as-continence*, we can see that the relationship between self-controlled individuals’ internal states and their behavior may be just as “direct” as the relationship between a temperate person’s internal states and *her* behavior. In other words, “direct resistance” is not the only kind of “direct relationship” that can hold between a person’s internal states and the relevant behavior, and it is only the latter that Levy claims is a necessary condition on the correct attribution of a character trait.

 Now, Levy may reply that this does not address a crucial way in which self-controlled people differ from the temperate: self-controlled people must rely on *indirect* resistance strategies, whereas a truly temperate person would be able (effortlessly?) to consume a moderate amount of ice cream even if an industrial-size tub were right in front of her.[[31]](#footnote-32) Levy claims that using these indirect strategies is an external crutch that implies that self-controlled people have no relevant character trait: claiming that the self-controlled person’s dispositions to modify her situation are part of a character trait “would be akin to claiming that someone is brave in virtue of wearing peril-sensitive sunglasses [that turn totally black in the presence of danger and thereby prevent the person from seeing anything frightening]” ([12], pp.207,204).

 Again, I think that Levy’s argument here at most shows that the trait of being self-controlled differs from the stereotype of continence. First, not all indirect strategies are as “external” as situation-selection and situation-modification. Attention-deployment and cognitive-change are indirect strategies involving internal, psychological states, and the relationship between the internal states involved in these strategies and the relevant behavior is “direct” enough to be consistent with the attribution of a character trait. (Indeed, temperate individuals (assuming there are any) may be *implicitly* using these strategies when they act, rather than their behavior resulting straightaway from some supposed stable, cross-situational harmony between their standing desires and their evaluative judgments. And if they implicitly used these strategies, it would not preclude the correct attribution of the character trait of *temperance* to them; the same would hold for the trait of being self-controlled.) Second, even behavior that is produced by the more “external” strategies of situation-selection and situation-modification need not be related to the internal states of self-controlled people in an “indirect” way that would rule out their having a character trait. For, successfully employing these strategies may rely on, e.g., excellent *shifting-specific* EF capacities, and there may turn out to be individual differences in these capacities (likely correlated with other individual differences) that are consistent with the attribution of a character trait concerned with the intelligent management of desire (i.e., being self-controlled).

 This relates to a final reason that Levy gives to doubt that being self-controlled is a character trait: a supposed difference in the etiology of self-control and character traits. In his view, character traits are developed by providing “models and paradigms” that aim to inculcate “the right kinds of emotional dispositions and ways of perceiving the world,” but self-control relies on “nonproprietary skills” and can be explicitly taught via “rules of thumb” ([12], p.207). While this line of thought deserves a lengthier response than I can give it here, I think that it relies on a false dichotomy. First, excellent EF capacities are plausibly required to successfully follow “rules of thumb,” and these EF capacities may *themselves* be constituted in part by “the right kinds” of emotional or affective dispositions (for the “emotional foundations” of EF, see, e.g., [48-50]). Second, some character traits (including “moral” virtues, as self-control may be according to the indirect harmony hypothesis, as well as “intellectual” virtues) may themselves best be understood as skills, casting doubt on Levy’s supposed etiological contrast (see [51-52]).

The indirect harmony hypothesis (and the theoretical and experimental findings on which it draws) has implications for future work on trait self-control and, in particular, for how that work should interface with research in neuroscience and cognitive psychology. Here I mention just two. First, research on trait self-control and its relation to EFs should broaden to include components (and measures) of set-shifting and related processes such as long-term planning and goal maintenance, since these seem to be crucial aspects of high trait self-control (see, e.g., [40], p.9; see, e.g., Dang et al. [53] for some evidence that exercising self-control impairs goal-maintenance and is associated with a “switch cost” (i.e., poorer performance after switching between simple tasks.). (This also connects to the idea that inhibition may be “nothing special” and that areas of the brain implicated in inhibition may be performing more general goal-related processing (such as goal maintenance), with inhibition emerging merely as a by-product of competition between different goal-representations. See note 21.) Second, given that shifting-specific EF ability may be a component of high trait self-control, research on this trait could profitably draw on work on the neuroscientific bases of set shifting, focusing perhaps on the anterior cingulate cortex (ACC) and its connections to prefrontal and subcortical areas [49, 54-55].

Research on self-control is thriving, due in large part to different theoretical and disciplinary perspectives being brought to bear on the complex and multi-faceted ways in which humans regulate their thought and behavior in the service of their most valued goals. This paper both draws on, and contributes to, this important trend. If the indirect harmony hypothesis is on the right track, then an empirically adequate account of trait self-control does not fit neatly into the traditional categories of continence and temperance. In light of this, we should rethink how those categories apply to self-control, reject models of trait self-control that (at least tacitly) understand it as continence, and perhaps introduce new categories that are better suited at capturing the self-control-related capacities that humans actually have.

**References**

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1. This idea echoes claims made in many papers by Roy Baumeister and his collaborators, e.g., that self-control is the “exertion of control over the self by the self” ([2], p.247). [↑](#footnote-ref-2)
2. Duckworth claims that “Moffitt et al. use the term [‘self-control’] synonymously with conscientiousness, a large class of personality traits that includes responsibility, industriousness, and orderliness” ([1], p.2639). I’m not sure that Moffitt and colleagues take ‘self-control’ to be *synonymous* with ‘conscientiousness,’ or even that they take them to be co-extensive, but they at least hold that self-control and conscientiousness are traits that significantly overlap. [↑](#footnote-ref-3)
3. According to Mele’s view, “temperate individuals are characterized by a remarkable but imperfect conformity of their appetitive desires to their relevant evaluative judgments, whereas self-controlled persons, though they are subject to temptation [i.e., having occurrent desires than conflict with their evaluative judgments] significantly more often [than temperate individuals], are very good at resisting [these desires]” ([10], p.170). [↑](#footnote-ref-4)
4. This is likely an oversimplification since one can arguably exercise self-control in the face of a desire that conflicts with one’s *intention* (even if one’s intention fails to align with one’s evaluative judgment). This is what Mele calls an “unorthodox” exercise of self-control. See ([11], pp.54-55). A disjunct to the above definition could be added to cover this kind of case. Here and below I use the phrase “conflicting desires” to refer to desires (impulses, motivations) that conflict with one’s evaluative assessments or judgments. [↑](#footnote-ref-5)
5. I adopt the label “direct” from Levy ([12], p.201). [↑](#footnote-ref-6)
6. Mele calls this “brute resistance” ([11], p.26). [↑](#footnote-ref-7)
7. Friedman and Miyake caution that a model that considers only these three EFs “should not be considered to be comprehensive (i.e., there are likely other EFs), nor should it be considered to be a hypothesis about elementary processes” ([17], p.188). [↑](#footnote-ref-8)
8. An anonymous referee wondered whether a traditional view requires (a). Strictly speaking, it may not, but self-controlled individuals without (a) would have a degenerate case of the trait (in a mathematical sense); they would not be paradigmatic self-controlled individuals, since their self-control would be entirely latent or counterfactual. That is, I take (b) to be central to the traditional view of self-control, and in order for (b) to be clearly manifest, self-controlled individuals must typically be subject to temptation in the relevant situations (i.e., they will satisfy (a)). For example, (a) is an implicit assumption in delay of gratification studies: if self-controlled individuals did not tend to have occurrent conflicting desires for marshmallows (i.e., were not average (or below) with respect to assessment-desire conformity), then these studies would not be taken to be measures of their ability to resist these desires. See [18] for a test of this implicit assumption. [↑](#footnote-ref-9)
9. It is anachronistic to include (c) as part of a thesis about continence that anyone held before the 20th century. However, traditional Aristotelians would have endorsed (c) if they had had the concept of EF. For the assumption that above average inhibitory EF underlies direct resistance ability see, e.g., ([14], p.42). [↑](#footnote-ref-10)
10. Like many measures of trait self-control, the Self-Control Scale is a self-report survey. Two anonymous referees raised concerns about the validity of self-report measures (e.g., people who *believe* that they are good at self-control may not actually be). These concerns deserve more space that I can give them here, but I’ll just note that many researchers cite the fairly strong correlation between self-report measures and other measures of putative trait self-control (e.g., reports from others, smartphone-based experience sampling) [12, 20]. Further, even assuming that self-reports of self-control reliably measure a trait, this does not imply that those self-reports accurately capture the *nature* of that trait. E.g., people may report that they are good at resisting temptations on a questionnaire, but they may not have reliable access to *how* they do so. So, even if they report strongly agreeing with the claim “I am good at resisting temptations” and may think that this is so in virtue of their being good at *directly* resisting, they may in fact *only* be good at using the indirect resistance strategies discussed below. This kind of “paradoxical” result (where individuals have a trait which has features that seem to conflict with some items on surveys that measure it) may be expected if individuals do not have reliable introspective access to the self-control strategies they employ, but the survey measure, as a whole, still manages to reflect individual differences in the strategies/capacities that are actually employed. See also the results of [21] which help to dispel any apparent paradox here. [↑](#footnote-ref-11)
11. Alternatively, on this model, self-controlled individuals may be especially good at conserving the self-control resources they have (whatever their “size”), but even in this case, self-control crucially depends on a resource that enables direct resistance. This model has been called “the classic view on self-control [which is] solely concerned with the inhibition of unwanted impulses and therefore prone to depletion effects” ([22], p.89). [↑](#footnote-ref-12)
12. In calling the indirect harmony hypothesis “schematic,” I am following Hilary Putnam’s suggestion that “the putting-forward, not of detailed and scientifically ‘finished’ hypotheses, but of schemata for hypotheses has long been a function of philosophy” ([23], p.433). So, while I think that some recent, converging research supports the indirect harmony hypothesis, I don’t pretend to have established that it is true it or that there are no studies in tension with it. Rather, I aim to show that it should be taken seriously and that doing so opens up promising avenues for future research that would be less apparent (if not ruled out) if high trait self-control continued to be understood as continence. [↑](#footnote-ref-13)
13. I use the phrase ‘self-controlled individuals’ to refer to people who score high on measures of trait self-control. The phrase itself does not imply that *being self-controlled* is a character trait, much less that it is identical to continence. (In Section 3, when I rebut an argument that being self-controlled is not a character trait, I often use the more transparently neutral phrase ‘people who score high on measures of trait self-control.’) Given how influential the *high-trait-self-control-as-continence* has been, it can be easy to forget that people who exhibit self-controlled behavior might not have a relevant character trait (much less one that fits the stereotype of continence). I suspect that some readers may find some of the claims I make in this paper puzzling for this reason. They may think: “How could highly self-controlled people not be strong-willed? They are strong-willed by definition.” There are controversial issues in philosophy of language lurking in the background, but here I’ll just express my doubts about such substantive appeals to analyticity. In any case, such readers should feel free to substitute a different word for ‘self-controlled’ if that helps them understand my revisionary proposal. The choice between revising our understanding of self-control as a character trait and replacing self-control with a different trait is relatively unimportant. [↑](#footnote-ref-14)
14. As an anonymous referee reminded me, George Ainslie’s “intertemporal bargaining” account of diachronic self-control, in which different “interests” within an individual are integrated with one another, is arguably an even more influential instance of this kind of account [25]. [↑](#footnote-ref-15)
15. This apparent disagreement with Fujita et al. is probably better understood as their being primarily engaged in a different project. I take their research program to be focused more on the variety of ways in which self-control can be exercised (at the “state” level), while I am concerned in this paper with what characterizes self-control if it is a character trait (and the neurocognitive capacities that may underlie this trait). [↑](#footnote-ref-16)
16. Drawing on Mischel and colleagues’ work on delay of gratification (e.g., [6]) and the Moffitt et al. study [2] I mention above, Levy notes that “it *seems* that self-control is a character trait,” and he claims that: “Psychologists call this putative character trait *trait self-control*” ([12], p.197, italics in original). Many psychologists treat self-control as a personality trait, but far fewer are explicitly committed to its being a *character* trait, in particular (i.e., a personality trait with certain distinctive features, e.g., being the product of a person’s choices and values. I won’t put much weight on the supposed distinction between personality traits in general and character traits in particular. Again, my main targets are views that assume that self-control is the character (or personality) trait of continence. Note that some philosophers have used work in personality and social psychology to defend the existence of character traits (the virtues, in particular) from “situationist” challenges (e.g., [26-27]). So, even though some researchers are not interested in “character trait” as an explanatory construct, others (e.g., contemporary virtue ethicists and positive psychologists) still are. [↑](#footnote-ref-17)
17. The phenomenon of ego depletion has been proposed as part of the “strength” or “resource” model of self-control mentioned above and is supposed to be a state in which one’s limited self-control resources are depleted. Recent studies have raised serious doubts about ego depletion (see, e.g., [29] for just one of many critiques). The indirect harmony hypothesis does not rely on it. [↑](#footnote-ref-18)
18. See Levy ([12], pp.201-3) for discussion of [7, 32, 35]. [↑](#footnote-ref-19)
19. For example, a Stroop task of naming the color in which a word is printed, rather than reading the color-word itself (e.g., saying ‘red’ when the word ‘blue’ is printed in red ink) not only requires subjects to inhibit the dominant, “prepotent” response (in this case, saying ‘blue’) but also relies on non-EF capacities like color perception and language comprehension and production. As a result, between-subject differences (hereafter ‘individual differences’) in performance on the Stroop task will reflect any systematic individual differences in the non-EF processes involved as well as individual differences in EF capacities themselves. [↑](#footnote-ref-20)
20. E.g., inhibition ability can be measured by combining performance on the Stroop task with other tasks that require deliberately stopping some fairly automatic response, such as the antisaccade task (in which subjects are asked to make saccadic eye movements away from, rather than toward, a target) and the stop-signal task (in which subjects perform two blocks of trials, e.g., categorizing words in the first block as quickly as possible, and then, in the second block, inhibiting this categorization response on only a proper subset of trials (when a ‘stop’ signal is presented)) [37]. [↑](#footnote-ref-21)
21. The near-perfect correlation between Common EF and inhibition raises a question about what exactly Common EF capacities consist in. While some have suggested that the Common EF just *is* inhibitory or that inhibition is the most important of all EFs, I tend to agree with Friedman and Miyake’s interpretation that “there is nothing special about inhibition,” that Common EF “reflects individual differences in the ability to maintain and manage goals, and use those goals to bias ongoing processing,” and thus that inhibition emerges as a by-product of more general processes of goal-maintenance, such as competition between action-plans (e.g., [17], pp.189, 194). [↑](#footnote-ref-22)
22. See also Wolff et al. [41], who failed to find any main effects of executive function ability on either self-reported trait self-control or real-life self-control failures. Similarly, von Gunten et al. [42] failed to find any positive correlations between inhibition EF and 28 self-control-related life outcomes (concerning, e.g., money, health, and media usage). An anonymous referee brought another recent study to my attention [43], which found that task measures of EF capacities showed no significant correlations with real-world self-control behavior. This referee also suggested that the failure to find a common neural basis for inhibitory EF casts doubt on inhibitory models of self-control (see [44]). I am sympathetic to this line of thought, but the neuroscience of inhibitory EF is complex and the bearing it has on the nature of inhibition (and its relation to trait self-control) even more so. Another referee noted that scores on tests that measure cognitive reflection and general intelligence (g) (which both overlap conceptually with EF) correlate “reasonably well” with temporal discounting (which is associated with trait self-control). This indirectly suggests that EF *is* correlated with trait self-control but does not provide much evidence about trait self-control’s relation to inhibitory EF in particular. I suggest that this correlation is mediated largely, if not entirely, by the shifting-specific component of EF, but further work needs to be done to confirm this. [↑](#footnote-ref-23)
23. Again, conscientiousness is commonly taken to be very closely related to (if not “synonymous” with) trait self-control. See note 2. [↑](#footnote-ref-24)
24. Given that the correlation between shifting-specific EF ability and trait self-control is fairly small, the authors suggest that other psychological factors, such as motivation, also constitute trait self-control ([46], p.357). See also [11], pp.59-60). [↑](#footnote-ref-25)
25. This occurrent motivational harmony is consistent with the existence of *standing* or *tacit* conflicting desires. Arguably, the self-controlled person must still have a standing desire for, say, chocolate that *would* conflict with their assessment of its value in *some* situations. Otherwise, being self-controlled would collapse into (the distinct trait of) being entirely *insensible* to the pleasures of chocolate. [↑](#footnote-ref-26)
26. Here I grant that continence may also involve being good at using these indirect strategies. An anonymous referee asked why this does not result in the indirect harmony hypothesis being merely a special case of *high-trait-self-control-as-continence.* It does not because, according to *high-trait-self-control-as-continence*, continent people cannot be good *only* at using indirect strategies, they must *also* be good at direct resistance (per clause (b)). My discussion of a passage from Levy [12] below emphasizes this. [↑](#footnote-ref-27)
27. Sometimes Levy qualifies this claim, suggesting only that there is reason to think that high trait self-control is “importantly unlike” our “paradigm” character traits ([12], p.208). [↑](#footnote-ref-28)
28. Levy’s paper [12] is titled “Of Marshmallows and Moderation,” and the term “moderation” is traditionally taken to be a synonym for “temperance.” However, he strangely does not discuss moderation/temperance anywhere in the paper. [↑](#footnote-ref-29)
29. These references discuss the “effortless” and “habitual” aspects of self-controlled individuals. The virtue ethics tradition would deny that temperance is a mere “mindless” habit, though, as it is supposed to involve the agent’s practical reasoning capacities. [↑](#footnote-ref-30)
30. As an anonymous referee pointed out, Levy’s account as a whole has a “subsidiary role for effortful inhibition” in that it allows that individual differences in trait self-control may, *in part*, be differences in willpower and that self-controlled individuals may still need to use direct resistance in some situations (perhaps especially in lab settings) ([12], pp.205-6). By contrast, the indirect harmony hypothesis claims that being self-controlled does not consist, even in part, in direct resistance ability (in line with the studies that tell against (b) discussed above). However, this is compatible with self-controlled people being excellent at *effortfully* (consciously, deliberately) employing *indirect* strategies. So, the indirect harmony hypothesis allows that effort may be an important part of trait self-control, although effortful *inhibition* (direct resistance) is not. (Direct resistance entails effort, but the converse is not true, as a wide variety of mental operations, not just the inhibition of impulses, may be exercised effortfully.) [↑](#footnote-ref-31)
31. It is not clear that temperate people differ from the self-controlled in this way, since, as A.O. Rorty notes, sometimes even a temperate person will “have to act as if were an enkrates, exercising forethought as a form of *enkrateia*, to avoid putting himself in the position of naturally strong temptation” ([47], p.274). However, I grant that *if* there is a trait of temperance distinct from the trait of being self-controlled, temperate people may need to use indirect strategies less often than the self-controlled. [↑](#footnote-ref-32)