



## Inner speech does not represent an epiphenomenon: Commentary on Verhaeghen and Mirabito (2021)

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*Using correlations and hierarchical regression analysis, Verhaeghen and Mirabito (2021) found that while self-awareness was associated with self-regulation, inner speech was not, suggesting that the latter does not play a causal role in either self-awareness nor self-regulation. This motivated the authors to claim that “inner speech is easiest understood as an epiphenomenon” (p. 8). In this Commentary, I suggest that the authors conceptualized and measured inner speech, self-regulation, and self-awareness in inappropriate ways. The two measures chosen to assess inner speech likely do not relate to either self-regulation (VISQ) or self-awareness (SVQ). Self-awareness was measured using composites of various scales assessing mindfulness (a related, yet different construct) which contains multiple items not representative of a typical self-awareness process. The self-regulation measure was also produced using various subscales assessing self-preoccupation and self-compassion—two self-processes very loosely associated with the target construct. Different results would have been obtained if the authors had used established measures. Their results contradict what has been consistently reported in the literature and do not cast doubt on the recognized fact that inner speech plays a significant, and often causal, role in self-awareness and self-regulation.*

**Keywords:** inner speech, self-awareness, self-regulation, mindfulness, self-preoccupation, self-compassion

Using correlations and hierarchical regression analysis, Verhaeghen and Mirabito (2021; henceforth referred to as the target article) examined relationships between the concepts of inner speech, self-awareness, and self-regulation. Put simply, they found that self-awareness showed associations with self-regulation but inner speech did not, suggesting that the latter does not play a causal role in either self-awareness or self-regulation. More specifically, inner speech positively correlated with some aspects of self-awareness and self-regulation, but once regression analyses were performed, inner speech failed to predict both variables. This motivated the authors to claim that “inner speech is easiest understood as an epiphenomenon” (p. 8).

This remarkable conclusion contradicts what has been reported in the literature these last 50 years. A large body of work based on Vygotsky’s insights (1943/1962) shows that private speech (out loud self-directed speech) in children causally influences multiple self-regulatory outcomes (Anderson-Day & Fernyhough, 2015; Winsler, 2009). To illustrate, performance of children on the Tower of London task (a measure of planning, an important part of self-regulation) is significantly lower when private speech is blocked using articulatory suppression (Lidstone et al., 2010); articulatory suppression consists in having participants repeat a word over and over (or counting backward from 100), thus interfering with the ability to emit self-verbalizations. Also using

articulatory suppression, Tullett and Inzlicht (2010) observed self-control deficits in adults on a “go/no-go” task.

Meichenbaum and Goodman (1971) designed a self-instructional training procedure aimed at developing inner speech use and showed a reduction of impulsive behavior in children. The authors of the target article ignore the vast research tradition of cognitive-behavioral therapy which firmly established its effectiveness in altering/replacing dysfunctional self-talk and improving multiple psychological outcomes (see Meichenbaum, 1977). Duncan and Cheyne (2001) observed more private speech produced by young adults when working on a difficult task as opposed to an easy one; note that problem-solving also represents an important part of self-regulation. The above constitutes just a few representative examples; to my knowledge, there is no existing data suggesting that inner speech is not related to self-regulation.

There is extensive evidence that inner speech is also related to self-awareness (see Morin, 2018). For example, several studies report significant positive correlations between proper measures of self-awareness and inner speech (e.g., Brinthaup et al., 2009). There is an increased activation of the left inferior frontal gyrus (a brain area involved in inner speech production) observed during completion of many self-reflective tasks such as endorsement of personality traits, autobiography, and prospection (Morin & Hamper, 2012). Further, inner speech facilitates awareness of mind-wandering episodes (Bastian et al., 2017). Moreover, studies using thought-listing procedures report frequent inner speech about the self (Morin et al., 2018; Racy et al., 2019). Some of the evidence suggests a causal connection: Inner speech loss following brain injury leads to self-awareness

deficits (Morin, 2009). Here too, to my knowledge, there is no existing data suggesting that inner speech is not related to self-awareness.

How is it possible then for Verhaeghen and Mirabito (2021) to claim that “most aspects of inner speech did not reliably predict any of the criterion variables...” (p. 18)? In what follows, I will suggest that the main reason for this assertion is that the authors conceptualized and measured inner speech, self-regulation, and self-awareness in strange and unheard-of fashions.

Let’s start with inner speech, which was measured using the Varieties of Inner Speech Questionnaire (VISQ; McCarthy-Jones & Fernyhough, 2011), and the Self-Verbalization Questionnaire (SVQ; Duncan & Cheyne, 1999). The VISQ mostly assesses phenomenological, as opposed to functional, qualities of inner speech—specifically: condensed vs. expanded, dialogue vs. monologue, and the voice of other people in inner speech. Even if one were to use proper measures of self-awareness and self-regulation (which was most likely not the case here, see below), there is no way that the VISQ would correlate with these two constructs because the items of the three aforementioned subscales do not pertain to these constructs. Indeed, how could items such as “I think to myself in words using full sentences” or “I talk back and forward to myself in my mind about things” be associated with items assessing self-regulatory and self-reflective tendencies? To be fair, one subscale of the VISQ measures evaluative/motivational inner speech (e.g., “I talk silently to myself telling myself not to do things”), which could be linked to self-regulatory processes; but there are only four such items out of 18, and two of them only could potentially be associated with self-awareness (e.g., “I evaluate my behavior using my inner speech”).

Duncan and Cheyne (1999) favored a view of private speech as a cognitive tool system and designed the SVQ accordingly, creating 27 items aimed at assessing spatial orientation and search, manual motor and organizational processes, attentional and cognitive processes, and expression and control of emotions. While some items of the SVQ do capture aspects of self-regulation (e.g., “I sometimes plan my actions out loud when I’m getting organized”), several do not (e.g., “I sometimes think out loud to myself when I’m proofreading something I’ve written”), and none seem to pertain to self-awareness. It is puzzling that the authors did not use more appropriate validated inner speech measures, such as the Self-Talk Scale (Brinthaupt et al., 2009) or the Inner Speech Scale (Siegrist, 1995). These scales would have correlated with both self-awareness and self-regulation, as our own research (e.g., Racy et al., 2019) and that of many others (e.g., de Sousa et al., 2016) has already shown.

Second, we have self-awareness. Appropriate validated scales measuring this concept already exist, such as the Reflection Rumination Questionnaire (Trapnell & Campbell, 1999), the Self-Consciousness Scale Revised (Scheier & Carver, 1985), or the Situational Self-Awareness Scale (Govern & Marsch, 2001)—all known to correlate with inner speech. Yet, Verhaeghen and Mirabito (2021) instead opted to create a Frankenstein-like measure heavily based on the concept of mindfulness, which arguably is not the same as self-awareness. Mindfulness is generally defined as non-evaluative self-focus in the present (Carlson, 2013) whereas self-reflection may be self-critical and includes

thinking about one’s past (autobiography) and future (prospection) (Morin, 2017).

As a result of this assessment choice, the working definition of self-awareness in the target article encompasses reflective awareness (the more active, deliberate, probing aspect of mindfulness) and controlled sense of self in the moment (the more passive, nonjudgmental aspect of mindfulness), each assessed by using composites of various scales such as the Observing subscale of the Five Facets Mindfulness Questionnaire (Baer et al., 2006), the Search for Insight/Wisdom of the Aspects of Spirituality Scale (Büssing et al., 2007), and the Sense-of-Self Scale (Flury & Ickes, 2007). The resulting creation represents a questionable measure of self-awareness, with items such as “I strive for insight and truth” (not necessarily about the self), or “When I’m doing things, my mind wonders and I’m easily distracted” (not at all about the self). Surprisingly, in the target article, the SVQ did correlate with the reflective awareness dimension of this “self-awareness” measure (the VISQ barely did), even though the subscale includes items such as “While walking, I am aware of the sensations in my body” or “I can pay attention to the clock ticking, birds chirping, and cars passing”. Any attempt to interpret these positive correlations is meaningless because the measure used does not assess genuine self-awareness, as normally defined in the literature.

Both inner speech measures were not associated with the controlled sense of self dimension of self-awareness: it is unlikely indeed that people who engage in efforts such as “Aspiring to beauty and goodness”, “Trying to widen the soul”, or wishing to be “(...) more consistent in my feelings” need recruiting inner speech. Unsurprisingly, following regression analyses using the measure examined above, inner speech failed to predict self-awareness.

Third we have self-regulation, defined in the literature as altering one’s behavior, resisting temptation, changing one’s mood, selecting a response from various options, and filtering irrelevant information (Baumeister & Vohs, 2007). Established scales exist—for example: the Self-regulation Questionnaire (Brown et al., 1999) or the Self-Control Scale (Tangney et al., 2004), which both have been shown to correlate with inner speech and self-awareness. For some reason, the authors elected to quantify self-regulation again using various subscales mostly borrowed from the Self-Compassion Scale (Raes et al., 2011), proposing that the construct is made up of self-preoccupation and self-compassion (both undefined in the target article). I fail to see how these two self-processes are connected to self-regulation as defined above; if they are, it is only in a very loose and indirect way.

Merriam-Webster (2011) defines self-preoccupation as “the state of being absorbed or occupied with oneself”, which closely resembles self-rumination as discussed by Trapnell and Campbell (1999) and which has been shown to impede self-regulation (e.g., Denson, 2009). Verhaeghen and Mirabito (2021) reversed scores of their self-preoccupation measure, apparently to transform it into the opposite concept of self-reflection. Self-compassion represents “compassion turned inward and refers to how we relate to ourselves in instances of perceived failure, inadequacy, or personal suffering” (Neff, 2016, p. 1). Both concepts are assessed using items such as “Uncertainty about the future

bothers me”, or “I try to see my failings as part of the human condition”—items unrelated to genuine self-regulation. The authors reported that both the VISQ and SVQ correlated with the self-preoccupation subscale of their “self-regulation” measure; if one interprets this subscale in terms of self-reflection, then these correlations align with those obtained by Trapnell and Campbell (1999) and others. The same inner speech measures were very weakly associated with the self-compassion subscale of their self-regulation measure. As stated before, any attempt at interpreting these positive correlations is counterproductive because the measure used does not directly assess self-regulation, as usually defined in the literature. Unsurprisingly, following regression analyses using the measures discussed above, inner speech failed to predict self-regulation.

In conclusion, no number of statistical analyses—correlations or regressions—will change the fact that the measures used to quantify the key concepts in this study were ill-designed, rendering the conclusions dubious. Verhaeghen and Mirabito (2021) themselves acknowledge that “Other measures of inner speech might have led to different results... The study was also limited by the actual scales and questionnaires used” (p. 20). As seen earlier, it is an established fact in the relevant literature that inner speech plays a significant, and often causal, role in self-awareness and self-regulation. It is my opinion that the results presented in the target paper do not in any way cast doubt on this fact. Stating that “Most of the time when we are talking to ourselves, nobody is listening, at least not in the sense that this inner talk has self-regulatory consequences over and beyond those of self-awareness” (p. 20) is arguably false.

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