



The curious incident of inner speech in self-regulation: A rejoinder to Morin (2022)

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Morin (2022)'s first objection is that our findings are at odds with the literature. We show that they are not: (a) We already agreed that inner speech and executive control can be causally related under specific circumstances, including in development, and (b) we obtained the same pattern of correlations between self-awareness, inner speech, and self-regulation others have. We reiterate that the issue is not the correlations, but the lack of evidence for any mediated relationship between habitual inner speech and self-regulation. We also argue against Morin's second point—the proposed inadequacy of our surveys. Ultimately, however, we feel that an empirical foray is needed to settle our differences and find truth, and we thus propose an adversarial collaboration to that effect.

Keywords: consciousness, self-awareness, inner speech, mindfulness

We greatly appreciate Morin's spirited rejoinder to our 2021 paper. In this reply to the Commentary, we will first clarify what we see as some misunderstandings of our position and our work, and then conclude with a proposal for a friendly adversarial collaboration, which we sincerely hope Morin will accept.

If we understand correctly, Morin sees two main issues with our paper. The first is that our findings are at odds with the literature; the second that our surveys are inadequate to address the question at hand.

Let's start, however, with clearing up a few things. That is, we found our position and data curiously misrepresented in the Commentary. We attribute this to the tension between the correlational results and the regression results. As Morin notes in his Commentary, in our paper "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" (Morin, 2022, p. 1). This is partially correct: We found that inner speech was correlated with self-awareness and both were correlated with self-regulation, but inner speech explained very little additional variance in self-regulation over and above self-awareness. This result suggests that self-regulation is mostly an offshoot of self-awareness and not of inner speech.

Next, however, (and this is the misrepresentation) Morin claims that our results "contradict [...] what has been reported in the literature these last 50 years" (p. 1). This is his first issue with our 2021 paper—that it is at odds with the literature. This assertion is, frankly, puzzling.

The first line of research Morin presents to support this position concerns experimental data that demonstrate (very)

proximal inner speech effects in settings requiring rigorous control over tasks novel to the participant. We wholeheartedly agree with Morin's position that there is good evidence for a causal relationship under such circumstances. In fact, we explicitly acknowledged this in the Discussion section of our 2021 paper (p. 20):

"We are explicitly not claiming that inner speech (apart from memory/attention regulation and evaluate/motivate, under the circumstances described above) is never or under no circumstances helpful over and beyond self-awareness. There is, for instance, a broad literature on the effects of concurrent inner speech on aspects of executive control, including task switching (e.g., Emerson & Miyake, 2003; Karbach & Kray, 2007). Our operationalizations of self-regulation are, of course, much more general and high-level compared with those of most studies that have shown inner speech to be beneficial—there is quite a difference between telling yourself to turn the screw clockwise to tighten it versus instructing yourself to be kind to yourself or to not get caught up in a negative thought pattern, or to engage your personal inner wisdom. It can, however, also be argued that in the grand scheme of things the latter type of self-regulation presumably matters more".

Likewise, in the Introduction to our paper, we cited similar work on the link between inner speech and executive control by Gade and Paelecke (2019), Kompa and Mueller (2020), Miyake et al. (2004), and Müller et al. (2009).

We also agree with Morin about the role of inner speech in development. We explicitly cited this case in the Introduction section of our 2021 paper:

"Over the course of development, inner speech increasingly becomes an internal means to support the child's own capacity for purposeful and independent action (Alderson-Day & Fernyhough, 2015; Jones, 2009), and takes over some of the functionality of external speech. Jones (2009, p. 167) offers the examples of learning to do arithmetic in

the classroom with pen and paper, later substituted with ‘mental arithmetic’, of shifting from learning to read out loud to silent reading, or of working one’s way through a social problem internally as if one had a dialogue with a teacher or parent”. (p. 8)

We briefly repeated this claim in the Discussion section of the 2021 paper as well:

“A second important point is that our sample consisted of adults. It remains quite possible that the situation might be different in earlier stages of development, where even high-level aspects of self-regulation might initially be under control of inner speech, as perhaps hinted at by the link between habitual inner speech and wisdom and the moral foundations”. (p. 20)

So, clearly, there never was disagreement between Morin and us on the point that inner speech can be useful in well-circumscribed circumstances.

The second line of work Morin cites to support the conclusion that our work is at odds with the literature concerns *correlations* between inner speech and self-regulation. Again, we obtained such correlations and we can only repeat that our conclusions are not based on correlations (which reveal nothing about causality) but on regression analyses. So, clearly, there is no disconnection between our work and the literature on that account—we obtained the same pattern of correlations everyone else has.

Morin’s second issue with our work considers the “strange and unheard-of fashion” (p. 2) in which we conceptualized and measured our constructs.

Let’s turn to self-awareness first. Morin’s background is in the study of inner speech; ours is not. As we explained in the paper, our study is an installment in an ongoing body of work where we examine the relationship between mindfulness (broadly construed as a manifold of self-awareness, self-regulation and self-transcendence) and beneficial psychological outcomes such as psychological wellbeing (Verhaeghen, 2019; 2021), (absence of) stress, depression, and anxiety (Verhaeghen, 2019), (lack of) prejudice (Verhaeghen & Aikman, 2020) and wisdom (Verhaeghen, 2020), as well as potential mechanisms/mediators for such outcomes, including variables such as ethical sensitivities (Verhaeghen, 2020; Verhaeghen & Aikman, 2020), awareness of privilege (Verhaeghen & Aikman, 2020), and virtue (Verhaeghen, 2021). The Verhaeghen and Mirabito study was set up to investigate yet another potential self-regulatory mediating mechanism for the effects of mindfulness, namely inner speech. These ongoing explorations obviously require a consistent set of measures on the mindfulness side. This set of measures was originally derived through exploratory and confirmatory factor analysis (Verhaeghen, 2019) and we simply carried it through here. Morin argues that the self-awareness aspect of mindfulness is not self-awareness at all; we, like Vago and Silbersweig (2012) beg to differ. Morin offers a list of “[a]ppropriate validated scales” (p. 2) for self-awareness; the surveys on that list concern a mixture of scales tapping rumination, reflectiveness, private and public self-consciousness, social anxiety, and an awareness of one’s surroundings—hardly a one-pointed, single-dimensional concept. Morin then cherry-picks items from the

FFMQ that are not about the self; we could respond by cherry-picking items like “I pay attention to how my emotions affect my thoughts and behavior”, “It is important for me to understand why I feel a certain way”, “When I have a problem, I take time thinking about it”, “I like to analyze my thoughts”, or “I am aspiring to broad awareness” for the reflective awareness component, and “I have a clear and definite sense of who I am and what I’m all about”, (the opposite of) “I think some of my emotions are bad or inappropriate and I shouldn’t feel them”, (the opposite of) “It seems I am ‘running on automatic’ without much awareness of what I’m doing” for the controlled sense-of-self in the moment component. Obviously, if our study had been designed from the inner-speech perspective, we likely might have settled on a different set of self-awareness measures. We thus propose that it might be a very good idea indeed to replicate our findings (or not!) with a different set of self-awareness measures—multimethod replications across samples are, we believe, a necessary endeavor in psychology. See the very last paragraph of this rejoinder.

Morin also criticizes our choice of inner speech measures, with the argument that the Self Talk Scale (Brinthaupt, Hein, & Kramer, 2009) and the Inner Speech Scale (Siegrist, 1995) would have been better choices. Here, however, it is our turn to complain about the content of scales. Because we wanted to explicitly investigate the self-regulatory aspect of inner speech, a scale that reflected these was crucial. The scale we used for that purpose, the Self-Verbalization Questionnaire (SVQ; Duncan & Cheyne, 1999), was specifically designed to capture the self-regulatory function of speech as initially proposed by Vygotsky. In contrast, the Self Talk Scale (Brinthaupt et al., 2009) measures the four factors of social assessment, self-reinforcement, self-criticism, and self-management, which to us seemed less suited to measure a broader concept of self-regulation. The Inner Speech Scale (Siegrist, 1995) is a unitary scale and in our reading covers mostly emotion regulation and reflectivity and so, again, presents as less broad.

In our factor analysis of the SVQ and the Varieties of Inner Speech Questionnaire (McCarthy-Jones & Fernyhough, 2011; we included this scale as an indicator of the phenomenology of inner speech) we obtained, among other things, clearly interpretable factors of problem solving, memory/attention regulation, emotion regulation, action guidance, and evaluation/motivation (see the Appendix in Verhaeghen & Mirabito, 2021). Each of those factors seemed and seem to us excellent candidates for capturing the regulatory aspects of inner speech. We are, frankly, perplexed by Morin’s statement that their preferred measures (the Self-Talk Scale and the Inner Speech scale) “would have correlated with both self-awareness and self-regulation” (Morin, 2022, p. 2)—their use of the word “would” here seemingly implies that our measures did not. They, in fact, very much did. Of the ten correlations between these five inner-speech factors and the two aspects of self-awareness considered here, nine were significant; the median absolute correlation was .21 (ranging from .03 to .39). Of the 30 correlations between these five inner-speech factors and the six aspects of self-regulation considered here, 22 were significant; the median absolute correlation was .16 (ranging from .00 to .37). Thus, our measures, “strange and un-

heard-of” as they appear to Morin, rather than yielding atypical results, fit with expectations, ours and Morin’s, namely that self-awareness and inner speech would be correlated.

On a smaller note, we are quite perplexed by Morin’s comment that “[u]nsurprisingly, following regression analyses using the measure examined above, inner speech failed to predict self-awareness” (p. 2)—we neither performed nor reported such regression analyses and the raw correlations are, as mentioned multiple times above, overwhelmingly significant.

What, then, do we have here? We have three sets of reliable measures (self-awareness, inner speech, self-regulation) with a pattern of intercorrelations. There is nothing unusual about these patterns. We are, however, the first team (as far as we can tell) that have applied mediational analyses to such data, thereby uncovering that inner speech does not contribute to the aspects of self-regulation measured here over and beyond self-awareness. Hence our conclusion that although correlations between the inner speech and self-regulation are present, there is no evidence for any mediated relationship involving inner speech. Evidence of mediation would be a necessary (but not sufficient) precondition for any causal inference.

Morin ends the Commentary as follows: “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.” We hope that our rejoinder has made it clear that we disagree with Morin and why. As stated above, we feel that a replication of our study using an extended set of measures would be a useful next step. We would therefore invite Morin to a friendly adversarial collaboration where both teams investigate whether inner speech measures indeed mediate variance in self-regulation over and beyond self-awareness—an enhanced and preregistered replication of Verhaeghen and Mirabito with sets of measures both parties can agree on.

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Received February 23, 2022

Accepted March 3, 2022