

Let's not forget about language proficiency and cultural variations while linking bilingualism to executive control

RAMESH KUMAR MISHRA
University of Hyderabad, India
rkmishra@uohyd.ac.in

Valian (2014) argues that current approaches in the study of bilingualism's beneficial effects on executive functions and cognition are at best methodologically weak. There is no unanimity on what constitutes executive function and which tasks measure it. I agree with her view that executive function is not a single phenomenon but a collection of processes. Different tasks measure different aspects of them. Performance on different executive function tasks is related to the particular cognitive demands of the tasks as well as the participants' profile. It does not follow necessarily that negotiating two languages should lead to an enhancement of ability on that task. Therefore, no single task can capture the cognitive benefits of bilingualism. Valian proposes that factors such as education, socio-economic status, and even extracurricular skills involving sports and exercise could boost executive functioning independent of bilingualism.

We have shown that Indian literates are better at visual search than Indian illiterates, even when one is not considering bilingualism (Olivers et al. 2014). One cannot be sure what bilingualism, as opposed to other such skills, does specifically to the mind. I would say that we simply as yet do not know which task or tasks mimic best what bilinguals do when they manage two languages. Also, the exploration of how executive control may be linked to bilingualism or any other skill is dependent on the mechanisms and definitions available in cognitive psychology and elsewhere. Recently, serious doubts have been articulated on concepts such as 'attention' (Anderson, 2011) and also on the age-old dichotomy of a top-down and bottom-up nature of attention (Awh, Belopolsky & Theeuwes, 2012). This can bring additional confusion while interpreting results. Bilinguals differ: on their fluency, proficiency, language dominance, age of acquisition, whether they live in a L1 or a L2 dominant linguistic environment. Therefore, one task or concept will not be applicable to all.

Valian says that language proficiency should not affect bilingual advantages. She says that if that is so, then interpreters should show better cognitive advantage. It is important to note that interpreters do not necessarily engage in creative language control during the task of

interpretation. They merely translate from one to another language and their own intentions do not manifest in their speech. Nevertheless, with regard to the question of language proficiency, it is important to note that the research strategy should be to compare bilinguals of higher proficiency with bilinguals of lower proficiency and not bilinguals with monolinguals. We have shown that highly proficient bilinguals do show evidence for better inhibitory control on an oculomotor version of the Stroop task and also on a variation of the same task that had higher monitoring demands (Singh & Mishra, 2012; Singh & Mishra, 2013). These studies have also shown that bilinguals show superior performance in the oculomotor domain. Thus, when we talk about tasks, we should also talk about response modality. Since a majority of studies have compared bilinguals and monolinguals, it is important to compare bilinguals differing in proficiency or frequency of switching. This is so particularly in linguistic contexts where there are no monolinguals, e.g. in India. Frequency of language use is linked to the sociolinguistic climate of the country i.e. L1 dominant or L2 dominant and patterns of language use; or work vs. home. Such variables should be studied closely to see how they influence and modulate executive control in bilinguals. While Valian pays sufficient attention to skills in sports and video game playing in their influence upon executive control independent of one's bilingual status, it is critical to look at both sociolinguistic and environmental aspects of bilingualism as they influence the link between bilingualism and cognitive control.

I agree with Valian's position that it is not only bilingualism but a host of activities like exercising, musical training and video game playing which can boost executive functioning. This view opens the possibility that even monolinguals who show good skills in these domains should match bilinguals when compared on executive functioning tasks. Therefore, it is not easy to find a sacrosanct effect of just bilingualism on a person's executive functioning unless such factors are controlled for. While viewing the use of two languages as a skill similar to any other skill, there is a catch. Language use is a far more creative and intellectual process than such tasks

as playing an action video game or exercising. Language is an intentional activity which has links with consciousness and the propositional structure of thinking. Therefore, language use should not just be viewed as a skill similar to taking part in sports when one is discussing its cognitive benefits. Infants start using language much earlier than they play any video game or music. It is therefore important to examine also the varieties of social and linguistic and intellectual reasons that lie behind bilinguals' practice of bilingualism across cultures. Lastly, I share Valian's suspicion of retrospective studies showing bilingualism's advantages in delaying onset of critical brain disorders. Obtaining statistical correlations from hospital records does not mean that patients were thoroughly evaluated for their bilingualism and other cognitive tasks while they were admitted (Alladi, Bak, Duggirala, Surampudi, Shailaja, Shukla, Ray Chaudhuri & Kaul, 2013). Only well-controlled longitudinal studies can inform us.

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