

# Two languages, two minds?

## Horrrifying Schrödinger

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One of the most important theoretical physicists of the twentieth century, Erwin Schrödinger, considered “obvious” that there is only one human consciousness, and that the feeling of having an individual mind is just that, a feeling (Schrödinger 1944). With all due respect for the father of the wave equation of quantum mechanics (for which he received the Nobel Prize in 1933), I will continue to assume we all have our own minds and our own self-consciousness, but just only one.

It is not difficult to imagine the Viennese genius turning in his grave if he could read the paper “Two languages two minds” (Athanasopoulos *et al.* 2015), because if the authors were right, an extra proliferation of minds in people would be involved. Athanasopoulos *et al.* echo the famous statement by Charlemagne that speaking another language is like possessing another soul, and they update it implying that speaking two languages is like having two minds. The phrase is good as a headline (although not as suggestive as that of Charlemagne), but it implies a rather drastic devaluation of what we usually mean by *mind* and (I suspect) a somewhat simplistic view of the relationship between language and cognition.

The logic of the experiments in which that conclusion is based is relatively simple. It is based on the interesting fact that monolingual German speakers are more likely to identify a video in which a person walks towards a car (without showing if the person reaches the car) with a video in which someone enters a house, than with a video in which someone goes towards a distant building without reaching it. This would imply that, when in doubt, these speakers tend to focus more on the end of the event (entering the house) than in the development of it (walking towards the distant building) and, therefore, they more often categorize the incomplete car video as of the first type. The reverse situation occurs with monolingual English speakers, which tend to identify the car video with the far building video (focusing on the unfinished development of the event). According to the authors, this is because the progressive aspect is grammatically encoded in English, while it is not in German. According to their data, only 37% of English speakers identified the event of the car with the house event, compared to 62% of Germans. It is an interesting phenomenon, no doubt about it, but it adds nothing to the already widespread and (in my opinion) unfounded claim that an “English” mind can be different from a “German” mind.

Bilingual subjects are the tricky case. If a German mind is different from an English mind (let us assume so for now), what is the mind of a German-English bilingual speaker like? Or does he/she have *two minds*? By now it is clear that we no longer know well what the word *mind* designates, but let us continue.

In a first experiment described in the article, German-English bilinguals tended to behave like monolinguals, though with less pronounced differences. So, when the experiment was done in a German context (because the subjects are given instructions in German and they have to respond in German), speakers tend more often to prefer the house video as more similar to the car video (and not the building video), whereas when the same subjects act in an English context, they tend to prefer the building video (which marks the event in progress, not completed) as more similar to the car video. Although the authors do not say it, this more moderate behavior of bilinguals can be an effect of the interference between languages, so that when they speak German they are less “German” than German monolinguals, and when they speak English they are less “English” than English monolinguals.

The second experiment is more interesting, but much less statistically conclusive, and more cumbersome in design. In this experiment the “verbally mediated categorization” of bilingual speakers is hindered by making them repeat aloud a sequence of numbers while performing the same task of the previous experiment. According to the authors, this interference task inhibits the language in which it is assumed that the subjects are thinking, and it makes them to choose the options that correspond to the other language. So, when bilinguals are doing the experiment in “German context” and their German language is interfered making them repeating numbers (in German!) while watching the videos, they are less likely to choose the house video (the one preferred by German speakers), and they are more likely to choose the far building video (the one preferred by English speakers). Halfway through the experiment a change is made, so that they have to say numbers in English (supposedly to disrupt access to this language) and then it turns out that they tend to choose more like “Germans”. The explanation offered by the authors is that when the task of verbal distraction interrupts access to the language of the context of the experiment, the other language takes over, so to speak.

This is not the place to assess the assumption that access to language (or, as the authors say, to “verbally mediated categorization”) can be interfered by the task of verbally repeating numbers. But it is worth noting the apparent contradiction in assuming that the active language can be interrupted, and assuming at the same time that the other language, supposedly inactive, comes to supply the “disrupted” one, because then it is not clear that the verbally mediated categorization (whatever it may be) has been really interfered. Note that the same task of distraction applied to monolinguals would imply that no language is used for the test (because they have no other language that may be a supply), which just shows that the influence of a given language in categorization is modest, unless we assume that there is no categorization of any kind. But this makes no sense, since in that case the monolingual subjects are not inactive, but continue identifying the videos (although using something that is not language, according to the logic of the authors).

The paper claims to have shown that English-German bilingual speakers have a flexible categorization of the world depending on which language is dominant in a particular task of identifying motion events. Its conclusions are rather ambitious: “These findings show that language effects on cognition are context-bound and transient, revealing unprecedented levels of malleability in human cognition.”

But if the effects of the spoken languages on cognition are context dependent and transitory, I think that what this study shows is that the effects of the specific language one is using on cognition are really weak or superficial, so that speaking of an unprecedented malleability in human cognition is not appropriate. If we accept that statement, then we should acknowledge that the term cognition is used in a different sense when used in the quoted text and when used to refer to human cognition in general (as compared, for example, to feline or avian cognition). Perhaps an underlying problem is that cognition is identified with categorization, but that is an overly complicated issue for this occasion.

Anyway, the suggestion that bilinguals have two minds contrasts with research on bilingualism in recent years. Judith Kroll et al (2015) summarize this progress in a recent state of the art which concludes: “Contrary to the view that bilingualism complicates the language system, this new research demonstrates that all of the languages that are known and used become part of the same language system”.

Bilinguals (contrary to what was believed in the past) do not work as two monolinguals, but their languages interfere with each other and tend to coalesce into a single system of knowledge. It has even been observed (see Kroll et al. for references) that the brain tissue employed in the storage and processing of the two languages is essentially the same. Of course, the bilingual brain is different from the monolingual brain, but not because the bilingual brain is split into two systems of knowledge (let alone two minds), but because it develops a more complex system of knowledge whose management increases certain abilities, just like lifting weights every day makes biceps grow.

The most notorious finding in recent decades of bilingualism research is that the two (or more) languages are always active and interfere with each other. It does not matter if the L1 is very dominant on the L2, if the two are very different in their morphology, phonology, syntax or even orthography, if one is signed and the other oral, or even if only one of them is used. The knowledge of a second language continuously and incessantly affects the use of the first language, and, of course, the knowledge of the first language (much more robustly) affects the use of the second one. The possible cognitive benefits of bilingualism derive from the extra need for the bilingual speaker to inhibit one of the languages when using the other, which provides an apparent improvement in the ability of solving cognitive conflicts (both in the use of language as elsewhere), and it even increases the protection against certain types of cognitive degeneration, including a delay of symptoms of Alzheimer’s disease.

Actually, the fact that the two languages are always active and interfere with each other is expected because they are part of a single system of knowledge (language). This conclusion does not support the vision of “two languages, two minds”, but, on the contrary, it shows that if there is a part of language that structures our mind and our consciousness (and it would be very strange if it is not), that part coincides with what languages have in common.

For the reader to be convinced of how frivolous (in the use of the word *mind*) may be the assertion that a bilingual has two minds, it is worth to consider an example of the opposite: a person with one language and two different minds. Indeed, whether there are people who have two minds (that is, if they are more than one person) has been seriously discussed, and I do not mean the cinematographic cases of dissociative identity disorders, but cases of people with a section of the corpus callosum connecting the two hemispheres of the brain. Perhaps the most famous case is P.S., a kid with split brain studied by Gazzaniga and collaborators (LeDoux, Wilson and Gazzaniga 1977).

Although it is a controversial issue, the authors suggest that each of the hemispheres of P.S.' brain was self-conscious and had its own mind. The interesting thing (in what affects us now) is that after the surgery, only the left hemisphere could talk, but both understood speech, and the right hemisphere began to communicate putting together Scrabble letters to form words, using the left hand. It seems that P.S. had, unlike the patients examined so far, a substantial part of language in the right hemisphere (even though he was not left-handed). The exciting fact is that the right hemisphere was shown to have feelings, to know what day was the day after, what profession he would like to exercise (different from that declared by the left hemisphere) and, in general, all the attributes of a human mind. As LeDoux, Wilson and Gazzaniga noted, "each hemisphere in P.S. has a sense of the self, and each possesses its own system for subjectively evaluating current events, planning for future events, setting response priorities, and generating personal responses."

The most important conclusion is that the fact that only in the case of P.S. the cognitive independence of the right hemisphere is detected, while the right hemispheres of other patients do not reveal such capacity for self-awareness (with the possible exception of another patient named Vicki), suggests to the authors that "the presence of a rich linguistic system is a reliable correlate, and perhaps a necessary prerequisite, to some of the richer aspects of mental life."

It thus seems that the ancient intuition that language lies behind consciousness and the nature of the human mind makes sense. But, contrary to the suggestion by Athanasopoulos *et al.*, the ingredients that form the fabric of our human mind are not the superficial, external aspects of language that differentiate German from English (i.e. those aspects subject to historical change and, therefore, variation), but what is common to all languages, including, of course, the various languages in the (single) mind of a bilingual.

I am convinced that this idea would have seduced Schrödinger.

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