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# Anticipation, thinking, and ecological psychology

(Commentary to Jytte Bang: Steps towards an ecological approach to thinking)

Jytte Bang's target article is an ambitious attempt to re-conceptualize the concepts of *anticipation* and *thinking* within, what she calls, a radical, ecological framework<sup>1</sup>. While we are generally sympathetic towards the author's enthusiasm regarding the potential of an ecological approach to human cognition, we will allow ourselves to address a few specific issues we believe are critical in the target paper. Our comment is structured around the following three questions: Is 'mainstream cognitive psychology' treated fairly by Jytte Bang? Are the re-conceptualizations of the concepts of anticipation and thinking adequate and precise? Are the sources of anticipation only to be found in-between the world and the individual? Each issue will be treated in turn.

### *Is mainstream cognitive psychology treated fairly by Jytte Bang?*

Given that Jytte Bang endorses a radical, ecological approach and intends to re-frame two concepts of which at least one of them ('thinking') is absolutely central within the field of cognitive psychology, it comes as no surprise that Jytte Bang is quite critical towards what she calls 'mainstream cognitive psychology'. According to Jytte Bang thinking and anticipation should be conceived as "a functional aspect of living life, of understanding and keeping in control with the environments in which humans live". However, Jytte Bang claims that this is not how the basic concepts of thinking and anticipation are understood within mainstream cognitive psychology. Jytte Bang writes:

[...] anticipation, if not conceived ecologically, takes us directly back to the persistent problems of dualisms in psychology. [...] Mainstream cognitive psychology does not exactly share the 'obvious' pragmatic view on thinking and anticipating elaborated above. Rather, it tends to separate thinking from persons, that is, from intentional individuals with bodies, living and acting together with others with whom they share interests, desires, feelings. [...] Cognitive psychology, in

general, adopts a dual perspective on thinking and struggles hard to make it all fit together.

Even if the abovementioned description was correct, or partially correct, we find the line of argument employed here problematic in at least three ways: First, Jytte Bang's criticism is presented without specific reference to the theory, or the group of theories, she is attacking. The reader is not provided with any specific examples substantiating that 'mainstream cognitive psychology' is actually based on the premises claimed by Jytte Bang; we will just have to take her words for it.<sup>2</sup>

Second, Jytte Bang makes no attempt to point out what might be called a 'rational core' in the position she is criticizing and rejecting. After all, there may be at least *some* rational reasons why the majority of modern textbooks on cognitive psychology does not endorse an ecological framework. There may even be reasons for dualism which we ought to understand before rejecting it (Mammen, 2000). Besides, the approach of just plain rejecting an opposing position makes it difficult for possible devotees of 'mainstream cognitive psychology' to respond in a constructive manner.

Third, 'mainstream cognitive psychology' may not be as homogenous a group of researchers as Jytte Bang seems to believe, and different branches may therefore not be equally vulnerable as targets to the criticism put forth. For instance, whereas the work of prominent researchers like Fodor (1975, 1983), Pylyshyn (1984) and Haugeland (1985) may explicitly insist on focusing on abstract properties of thinking and thereby be potential targets of dualism (although, for instance, Fodor himself would prefer being called a rationalist, see Fodor, 1997), other notable cognitive psychologists are clearly not. Researchers working with connectionism as a tool usually emphasize that their approach takes the insights from neuroscience very seriously, and we doubt that the majority of researchers working with neural nets would endorse being categorized as dualists (e.g., Clark, 1989, Elman, Bates, Johnson, Karmiloff-Smith, Parise & Plunkett, 1996; Quinlan, 1991; Rumelhart & McClelland, 1986).

To summarize, we do not think that mainstream cognitive psychology is treated sufficiently fair in the target article.

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<sup>2</sup> The target article contains one reference to 'mainstream cognitive psychology', namely to Mayer (1992). However, Mayer is only referred to as a cognitivist example of the relation between cognition and behavior. All other points of critique from JB towards cognitive psychology are just claims without specific references or citations.

## Are the re-conceptualizations of the concepts anticipation and thinking adequate and precise?

Jytte Bang does not seem to offer any explicit definition of anticipation. Rather she argues that anticipation is – or ought to be – viewed as a basic *premise* for any attempt from a living organism to deal with and adapt to the world. Jytte Bang states:

*Anticipating is a functional aspect of living and participating meaningfully in a world of resistance, ambiguities and choices.* (italics by author)

Thus, according to Jytte Bang, anticipation – conceived as a functional aspect of living – is an overlooked cornerstone of any attempt to survive for a living creature. In order to understand anticipation we, according to Jytte Bang, therefore need to begin our analysis in the environment – not in the head of the subject. In Jytte Bang's own words:

The attempt, thus, is to see, how close to the phenomenon of anticipation in individuals one can get without beginning solely with the individual mind – which would only reproduce dualism once again. The dynamic and historical/developmental nature of the relation between organism/individual and environment must be the point of departure.

While we are sympathetic to the idea of what resembles the functional-historical analysis of concepts originally outlined by Leontiev (1981) and Holzkamp (1977), we are somewhat sceptical regarding the usefulness of the specific conceptualizations presented here by Jytte Bang. The problem is, in our view, that the specific conceptualization of anticipation offered by Jytte Bang is simply not sufficiently explicit and precise. This becomes evident if we take a closer look at the italicized paragraph on anticipation quoted above. The problem is, as we see it, that one could quite easily substitute the word 'anticipation' with a range of other words and still agree. For instance, the words 'imagining', 'ambivalence', 'doubt', and 'enthusiasm' could all fairly easily be inserted on X's place in the sentence 'X is a functional aspect of living and participating meaningfully in a world of resistance, ambiguities and choices.' Jytte Bang may respond that she never intended to offer an explicit definition of the term anticipation, but only tried to outline the premises for doing so. If this is the case, then the premises offered appear to be so broad and non-constraining that we hardly find the suggestion productive.

We now move on to Jytte Bang's analysis of the concept of *thinking*. Jytte Bang does not offer a definition of this central term either. If we are looking for a definition which is fair to mainstream cognitive psychology we could refer to the inspiration from Jerome Bruner's (1957) now classical treatment of the concept. This seems to be the case also in a typical cognitive psychological textbook definition:

Thinking: The cognitive processes of going beyond the information given; thinking also has a goal, such as a solution, a decision, or a belief. (Matlin, 2005, p. 508).

In order to give flesh and blood to the academic terms, Jytte Bang provides us with a typical situation from everyday life in which a child is going to buy a present for a birthday party. According to Jytte Bang, we will have to conceive of thinking as something transcending the 'here and now'. Jytte Bang writes:

The situation of buying a present in a toy store is not simply a situated activity, if by situated is meant somebody acting in some specific environments on some specific time.

Rather, according to Jytte Bang, our analysis of the child's thinking should be understood within a more 'global situation', taking into account the overall context constituting the specific situation in the store (including, for instance, the girl having the birthday party and her interests and preferences, other friends, parents, conventions regarding how expensive the gift should be, the time-schedule, etc.). Inspired by Hegel's concept of the *negative*, Jytte Bang offers the concepts of the 'present' and the 'absent' in order to be able to speak about objects and persons that, strictly speaking, are absent in the specific situation, but nevertheless still may have impact on the girl's decision in the toy store regarding which gift to buy. According to Jytte Bang, we simply have to abandon the cognitivist approach since it would be too simplistic. Jytte Bang summarizes her position as follows:

It seems quite difficult to insist on a cognitive-structural description of the thinking processes of the child, because it would end up being a fixation projected from the child's mental apparatus into the world and that would be quite disrespectful as to the complexity and dynamics of the child's acting in the global situation. How and what the child thinks is dynamically related to how the child relates to herself as an intentional agent in a human life-world in which she continuously and (to her) meaningfully generalize experiences (I neglect un-dynamic concepts like 'schemata' or 'scripts' here; they have no explanatory power). In a dynamic global situation thinking is 'global' if the child is meaningfully involved; because of that we need to study the more or less specific and/or general features of 'globality' of the situation for the child if we want to conceive thinking ecologically. This is the overall theoretical and methodological claim following the analysis of the article.

We completely agree with Jytte Bang that in order to really understand how the child thinks when trying to make the decision on which present to buy, we will ultimately have to take into consideration a range of aspects that are not directly

present in the toy store. However, we may have doubts whether ‘mainstream cognitive psychology’ would actually disagree as well (Mammen, 1994). Let us recall the textbook definition of thinking we quoted above. Thinking was defined as: “The cognitive processes of *going beyond the information given*; thinking also has a goal, such as a solution, a decision, or a belief.” (Matlin, 2005, p. 508, italics added). While Jytte Bang and mainstream cognitive psychologists may disagree on whether thinking should be understood as a mental achievement, they may *not* disagree on taking literally absent features into account when considering thinking – contrary to what Jytte Bang seems to claim. In the textbook definition, thinking is simply *defined* as the cognitive process of going *beyond* the information given.

We were also somewhat surprised to see that Jytte Bang dismisses the concepts of ‘schemata’ and ‘scripts’ which according to Jytte Bang have ‘no explanatory power’. Although schemata are today often conceptualized as ‘structured clusters of concepts’ (e.g. Eysenck & Keane, 2005), which Jytte Bang may find problematic, the original conceptualization of schemata outlined by Bartlett (1932) may be more in accordance with the ecological approach endorsed by Jytte Bang. According to Bartlett, schemata are not just summary representations of resembling instances, but rather contain personally flavoured and, to some extent, constructed aspects preparing us to anticipate the future. Thus, Bartlett’s (1932) original understanding of schemata may actually contain the anticipating nature that Jytte Bang is missing in mainstream cognitive psychology.

While we find that Jytte Bang’s conceptualisations of the terms anticipation and thinking are too broad and implicit, the relation *between* the terms is clearly explicit in the target paper – although controversial and, in our view, wrong. Jytte Bang writes the following on the relation between anticipating and thinking:

*Anticipating* is the needed process of an individual living organism, and thinking in humans is just a specific and unique case of this functional demand. (italics by author)

Contrary to conventional use of the term anticipation and the textbook definition of the term thinking, Jytte Bang states that thinking is just a special case of anticipating. We must admit that we are quite sceptical towards the hierarchy proposed here. In our view, thinking is not adequately categorized as a special case of anticipating. The problem is, that if it were true, then every incident of ‘thinking’ should belong to the broader category of ‘anticipating’ – otherwise it could not be a ‘specific and unique case’ as claimed by Jytte Bang. An everyday example should illustrate why we do not think that this is the case:

We believe that most people would agree that the process of reading the target article, of preparing and writing a comment, ought to involve at least *some* element of thinking. While one may argue that certain aspects of this process may involve anticipation (e.g. expecting to submit the comment at some time; expecting to get a reply), other aspects, in our view, simply have nothing to do with anticipation at all – at

least not in the literary sense of the word. For instance, while the process of thinking about what specifically to comment on, and deciding which arguments to put forth, (hopefully) involves thinking, we cannot see how such activity – above all – should be about anticipation, as claimed by Jytte Bang.

To summarize, we do not think that the re-conceptualizations of the concepts of anticipation and thinking are sufficiently precise and adequate.

### *Are the sources of anticipation only to be found in-between the world and the individual?*

Jytte Bang argues, that ‘mainstream cognitive psychology’ has put far too much emphasis on finding mental structures in the head of the individual. According to Jytte Bang – and to a large extent inspired by Gibson’s (1966, 1979) ecological approach on visual perception – we ought to look for the information on which anticipation is based in the relation *between* the individual and his or her life-world. As quoted above, Jytte Bang attempts to investigate “how close to the phenomenon of anticipation in individuals one can get without beginning solely with the individual mind – which would only reproduce dualism once again.”

We agree that one could put too much emphasis on mental structures without paying sufficient attention to the ecological niche constraining and providing the frame for the mental achievement. As argued convincingly by Dreyfus (1972) that was exactly the case in the early days of AI. However, putting every effort in the description of the surrounding life-world while neglecting mental structures may not necessarily be a better solution than the one Jytte Bang criticizes. We will attempt to substantiate our claim by referring to a recent study by Warneken, Chen and Tomasello (2006) where chimpanzees and 18- to 24-months-old children were supposed to interact in four cooperative activities with an adult experimenter. Two of the activities were of a problem-solving character (a. getting access to an object in an ‘elevator’, b. retrieving a toy from a large tube that could only be opened if two distant handles were activated at the same time); the other two activities were social games (c. sending an object down through one of two inclining tubes and catching the object with a tin can, d. making a wooden block ‘jump’ on a hand-held trampoline). Note that all of the four tasks could only be carried out successfully provided that two individuals cooperated in the activity. After witnessing a successful demonstration by two adult experimenters, it was scored whether the subject would attempt to get one of the adult experimenters to cooperate in the target activity. The results showed that whereas all children made at least one attempt to reengage the adult experimenter in the target activity, none of the chimpanzees ever made any attempt to do so (Warneken, Chen & Tomasello, 2006).

Now, if we took the approach suggested by Jytte Bang and attempt to understand anticipation – a very broad and

highly hierarchically placed ability - by looking at what happens in the surroundings of the subjects participating, we would *not* be able to explain the differences between the results of apes and of children by means of registering any substantial differences between the tasks presented to the apes and the children respectively – simply because the situations were identical (Warneken, Chen & Tomasello, 2006). Nevertheless, the results from the study show us, that the apes faired quite differently relative to the children. The apes were, to a far less extent, able to engage in cooperative activity than human children, and we doubt that this difference could be explained by only looking at the life-world between the participant (be it an ape or a child) and the environment. In our opinion, looking at species-specific differences and hence ultimately at mental structures is simply unavoidable when attempting to understand cognition.

To summarize, we do not think that the sources of anticipation (provided that we for a moment accept Jytte Bang's broad definition of the term) is exclusively to be found in-between the world and the individual.

Finally, we would like to add that while Descartes' (1641/1901) attempt to solve the mind-body problem was clearly not adequate (how could it be at that time?), the analysis in which he stated the problem is, in our view, still legitimate (Mammen, 2000). For instance, if someone closes his eyes and attempts to recall the winning tennis serve he made yesterday, this experience certainly has different qualities with respect to access and physical properties than actually producing the winning serve here and now. And we are not convinced, that this problem will reach a solution by insisting on exclusively looking for thinking in the inter space between subject and object and refraining from taking mental phenomena into consideration as Jytte Bang suggests.

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