Commentary

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Human Development

Whence *Container*?

Commentary on Alessandroni and Rodríguez

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The current target article provides a robust investigation of the "cultural character" of cognitive development. This investigation has both theoretical and empirical/methodological aspects. Methodologically, the authors argue for a unit of analysis concerning the development of object knowledge that includes other agents engaged in communication with the infant (i.e., that includes the sociocultural aspects of the infants' developmental environment). We agree with such a position and further illustrate its utility in our own analysis of the phenomenon of overimitation. With respect to the underlying theory, we agree with the arguments against strictly cognitivist frameworks (including those with a more recent "embodied" flavor), as well as the fundamental importance ascribed to sociality and culture. However, for some aspects of the *pragmatics of the object* paradigm we would suggest narrowing the scope about the necessity of culture for development while in other respects we would like to suggest possible elaborations or extensions. Perhaps most fundamentally, we suggest that the physical versus cultural split that frames the target article discussion is not as metaphysically fundamental as seems to be presupposed.

Unit of Analysis

A central point of the article is that the appropriate unit of analysis for studying development, including cognitive development, is not circumscribed by purely physical/cognitive considerations. From the *pragmatics of the object* perspective, children's developing knowledge of objects involves an essential sociocultural context of communication and functionality. Accordingly, the authors argue that the minimum

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unit of analysis for empirical inquiry ought to be the triadic interactions between the child, object, and adult. Similar to their suggestion about triadic interactions as the proper unit for empirical inquiry, we have argued elsewhere for the value of social situations as an important unit of analysis in the areas of social cognition and social learning [Allen, 2015; Allen & Bickhard, 2013; Allen & Ilgaz, 2017].[1] Further, we agree that there is a general neglect in the literature of the importance of considerations beyond the strictly "cognitive" – such as social and motivational – considerations. Our work suggests that overimitation is a good example of this neglect, and a realm worth pursuing in investigation. We provide a brief discussion of this work here as an addition to the target article's argument for the importance of the sociocultural realm, even regarding cognitive developmental phenomena.

Overimitation is the copying of *causally* irrelevant transformations on a *novel* object/artifact despite *clear* evidence that those actions are unnecessary [Horner & Whiten, 2005; Lyons, Young, & Keil, 2007]. In their original study, Horner and Whiten [2005] demonstrated a sequence of actions and artifact transformations on one of two boxes in order to retrieve a reward from within. When the box was opaque, both 3- and 5-year-old children and adult chimpanzees copied all of the steps in the sequence. However, when a transparent box was used so as to make clear that some of the steps were causally unnecessary (e.g., that pushing the stick was actually just tapping on a false ceiling inside the box), the chimpanzees, but not the preschoolers, failed to copy the unnecessary steps in the sequence. This high-fidelity copying behavior by children but not chimpanzees was particularly interesting for two reasons: (a) previous research had shown that infants and toddlers were selective imitators (i.e., copying only those actions that were relevant), and (b) it was surprising to discover that children would "blindly" imitate object transformations that even chimpanzees knew were unnecessary to the causal functioning of the object.

Three general perspectives have been developed to explain the basis of overimitation behavior. The first two construe overimitation as a by-product of other processes whereas the third considers overimitation to be part of the normative nature of human living. First, the *cognitive learning* perspective focuses on the artifact as a physical object. In this view, overimitation is interpreted as a by-product of a generally adaptive strategy to faithfully copy all of an adult model's intentional actions and encode them as being causally meaningful [Lyons et al., 2007; McGuigan, Whiten, Flynn, & Horner, 2007]. The main limitation of this approach is that it ignores the social nature of imitation activity. In contrast, the *social-motivational* perspective focuses on the social function of imitation that is thought to emerge around the second year of life [Uzgiris, 1981]. From this perspective, children overimitate as a manifestation of their social motivation to affiliate with the adult model while the artifact itself is considered largely irrelevant [Call & Carpenter Malinda, 2009; Nielsen & Blank, 2011]. The main limitation of this approach is that it does not consider that the child might still be engaged in *learning* something.

The third perspective, the *norm-learning* approach, characterizes overimitation as a consequence of children learning how they ought to interact with the artifact [Kenward, Karlsson, & Persson, 2011]. Accordingly, the normative structure of what is being learned will have conventional/arbitrary aspects that might be causally un-

[1] While we agree with the necessity for cultural and language considerations, we do have some difficulties with the semiotic basis for triadicity that the authors rely on. See, e.g., Bickhard [2017].

necessary. From this general perspective, children interpret the model's actions as the normatively necessary way of engaging with the artifact.

A more social version of the norm-learning perspective is one in which the focus expands beyond the artifact per se to the social situation. That is, an approach in which children are learning about the normative structure of the broader social situation of which the artifact is a central aspect [Allen, 2014; Allen & Ilgaz, 2017; Király, Csibra, & Gergely, 2013].

From the current perspective, a major function of imitation is for learning about social realities[2]. Social realities are mutually held interactive characterizations of the situation and constitute the basic social ontology for human culture [Bickhard, 2008, 2009]. Accordingly, children in overimitation situations are learning about social realities in which cultural artifacts are typically embedded. Thus, overimitation is not a by-product, but rather, it is a consequence of the nature of learning about social realities. For an everyday example, consider a demonstration about how to play the "novel" game of billiards. After a demonstration, it is likely that the normative objective is to get the balls in the holes using the white ball and pool cue. If instead you use your hands, because this is more effective, then you are simply refusing to learn how to participate in the social reality that we call billiards. It is only when we reduce cultural affordances to the causal functioning of objects that we would consider the hand use behavior as "efficient," "rational," "selective," "intelligent," and the cue use behavior as a "dumb" by-product of normally adaptive processes.

While inappropriate for humans, such a reduction from cultural affordances to causal affordances seems better suited to characterizing nonhuman primate imitation behavior in that they seem to copy actions irrespective of other more "social" or "cultural" considerations. In general, enculturated primates are able to learn how to make use of an adult for rewards (i.e., to instrumentally imitate or emulate). Further, when the causal functioning of an artifact is *opaque*, they will copy what turn out to be causally irrelevant actions [see above the study results by Horner and Whiten, 2005]. This suggests that certain nonhuman primates can engage in forms of social learning that may enable minimal forms of cultural use – i.e., tool use. However, nonhuman primates do not seem to engage in imitation as a kind of social reality (i.e., for social purposes) and they do not seem to engage in imitation to learn about social realities (e.g., overimitation).

Sociocultural Mediation for Knowing Objects

These differences between human and nonhuman primates' social-learning behavior highlight a distinction that is relevant to the theoretical importance of triadic interactions[3] for cognitive development. The authors of the target article argue that sociocultural agents are a necessary mediator for the infant's construction of knowl-

[2] Further, imitation situations are themselves social realities that provide sufficient common ground to enable social participation prior to a more complete social understanding. In this way, imitation serves as a social-bootstrapping mechanism for cultural learning and cultural participation.

[3] It is not entirely clear that triadicity being present from birth is an appropriate description of all cultures. Further, the large variability – outside of WEIRD (white, educated, industrialized, rich, and democratic) populations – for the amount of triadic interactions does not seem to affect infants developing into culturally capable participants.

edge. We think a distinction can be drawn for two different senses of such "necessity": a scaffolding necessity and an ontologically constitutive necessity.

A sociocultural agent may be necessary in terms of a contingent fact about humans' uses of adult scaffolding to learn something more quickly. Imagine a 2-year-old being introduced to a pen for the first time. Their exploration of the object will eventually lead to a discovery that it can make marks on surfaces, although this could be discovered more quickly with adult mediation[4]. Accordingly, it is not clear why object representation in terms of such interactive affordances *requires* sociocultural mediation. If object representation was a matter of encoding relationships to the object upon which *use* needed to be added, then *use* would be knowledge above and beyond the object (i.e., "*object* and *object use* do not coincide and should not be confused" [Alessandroni & Rodríguez, this issue, p. 157]). But from an action-based approach to object representation where objects are known in terms of their interactive affordances, "use" is already constitutive of knowing the object at all.

If use is intended to be equivalent with culturally agreed *use* (i.e., culturally "proper" function), then perhaps a cultural mediator is necessary for some types of objects (i.e., opaque objects like computers). However, for objects with relatively simple interactive affordances, if the agent shares the "same" purpose as the culture for using the object (e.g., if I need to carry things), then why could I not (eventually) discover such proper functionality for myself? What a cultural mediator seems to (implicitly) provide with guided participation involving artifacts are the culturally shared purposes. When these culturally shared purposes involve social realities, then the need for a cultural mediator is more clear.[5]

Accordingly, this brings us to our second sense in which a sociocultural agent may be necessary. They are necessary for co-constituting a social reality. Overimitation research is interesting because it shows the sense in which an artifact can be understood as more "physical" or as more "cultural"[6] – are the relevant "affordances" strictly physical, or are they (also) social? The difference between the two, however, is in terms of social ontology, not in terms of meaningfulness per se. From an action-based approach, all representation is inherently *meaningful* because all representation is an interactively defined relationship between the subject and the world[7]. Accordingly, we would make a distinction between the interactive affordances of physical objects (those that are perceptually transparent) and the interactive affordances of social situations that involve objects and agents (i.e., those that require being able to participate in or knowing about social realities).

The differences between children and nonhuman primates then might be both quantitative and qualitative. For a quantitative consideration, both children and nonhuman primates are able to use adults in the scaffolding sense with differences likely

[4] What we assume cannot be discovered individually are the culturally appropriate (or inappropriate) uses of the pen.

[5] We should note that this point does not affect the argument against the "image" model of CONTAINER.

[6] Three-year-olds do not necessarily overimitate in such situations, which suggests that they may understand the object more as a physical object than as a cultural one. Importantly, this is not intended to be an absolute claim about 3-year-olds but as an illustration of the continuity between different levels of meaningful representation.

[7] However, the "full" differentiation of subject and world is something that itself must develop over the course of the first two years.

being a matter of degree (i.e., the depth, extent, or complexity of the opacity involved in the constructive process that is being supported). In contrast, a nonhuman primate's apparent lack of interest in imitation as a social reality, or use of imitation to learn about new social realities, suggests more of a qualitative difference with humans in the constitutive sense of the mediator being necessary. Accordingly, it is the latter form of sociocultural mediation that may be essential for understanding the development of human forms of development.

Normative Emergences

At a theoretical level, the authors raise the issue of the "emergence of conventions" to frame their critique of cognitivist approaches. They question how the *factual embodiment* of image schemas can be integrated with the *normative conventions* of a semiotic system such as language. In response, to this question, the authors offer two possible answers:

(a) Either the conventional aspects of linguistic communication constitute emergent and spontaneous properties that appear ex nihilo from certain embodied recurrent patterns, or (b) it is necessary to explain the constructive trajectory of the cultural and public conventions that allow, eventually, for the existence of public agreement degrees within linguistic communication [Alessandroni & Rodríguez, this issue, pp. 144–178].

The authors advocate for option b and seek to explain how image schemas can be considered a cultural product in that they correspond to uses of objects that are themselves conventional. While the fundamental distinction the authors draw between the physical/cognitive realms on the one hand and the meaningful/social/linguistic realms on the other seems important, we caution against too sharp a divide (i.e., a metaphysical divide)[8].

We agree that there are prelinguistic forms of social interaction and communication – and (developmentally) necessarily so – but we would avoid the idea that it is conventions "all the way down." Mental phenomena are normative through and through but not all normativity is social. In particular, representation involves an emergent form of normativity – the normativity of truth-valued aboutness [Bickhard, 2006, 2009]. In turn, the emergence of representation is ontologically tied to embodied organisms interacting with their environment. However, the authors reject embodiment in general and affordances in particular as being insufficient to account for culture. While this may be true, embodiment in the pragmatist tradition of an action-based approach does provide a *necessary* ground for the emergence of mind, sociality, and culture [Bickhard, 2006, 2008, 2009]. Further, affordances do not have to be modeled as being strictly physical but can be modeled in terms of *indications* of interactive potentialities, and it is the indications that yield the crucial emergence of truth-valued aboutness (that is, the indications can be false [Allen & Bickhard, 2011]).

[8] There would also seem to be problems for image schemas as a foundation for representation. Sensorimotor images are either metaphorical themselves, or else they presuppose representation (images) and, thus, cannot ultimately ground representation. Also, although sensorimotor images are supposed to be images of sensorimotor action and interaction, they are themselves static – or at least there is nothing about them being themselves dynamic or processual in the model.

Conclusions

We applaud and agree with the authors' point that the developmental literature tends to neglect social and cultural considerations with respect to "cognitive" development, and we offer work on overimitation as a further example of the importance of such considerations. Related to this point, we also agree that there are prelinguistic forms of social interaction and communication that are necessary for social and linguistic development per se. So, we are in strong agreement with the basic frame of the target article. It deserves careful consideration.

We do, however, have some differences, some perhaps minor, and one, at least, perhaps more fundamental. Regarding affordances, for example, it is correct that some advocates of affordance models take affordances to be strictly factual relationships between an organism and its environment. But this is arguably a seriously problematic model: affordances as indications of interactive possibilities are not strictly factual, but can be true or false. It is difficult to work with a model of strictly factual affordances because, among other problems, it becomes difficult to account for organism error, and such error can clearly occur. So the contrast with strictly physical and factual affordances drawn in the article seems to us to be correct insofar as *that model* of affordances is the target issue, but we would argue that there are more theoretically useful notions of affordances as being indicated that have normative properties of truth value, and are, thus, not strictly factual and physical – they have a normative aspect.

We also have some differences regarding semiotics. Semiotics addresses phenomena of reference and meaning, and that is, as stated above, a necessary realm to take into account in developmental theory. But semiotics does so in a manner that is itself questionable [Bickhard, 2017]. We will not get into those problems here, but do wish to point out that, insofar as this framework is itself problematic, it may not successfully resolve issues that arise from a strictly factual/physical approach to cognition and cognitive development.

Finally, we would suggest that the realms of the physical and the realms of the mental and normative are not two sides of a fundamental metaphysical split but, rather, are related and integrated via a complex hierarchy of emergences [Bickhard, 2009]. If this is correct, or even conceptually possible, then the frame of the argument needs to be modified: it is not a mutually exclusive dichotomy between facts and norms.

In sum, we are in strong agreement with the basic argument of this article, and support its conclusions with some considerations and some research of our own. We do have some disagreements at some more detailed levels, as well as a possible difference concerning a fundamental metaphysical issue. The article offers significant steps forward and a focus for further research and discussion concerning empirical, methodological, theoretical, and even philosophical issues.

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