Letters to the Editor

More smoke than mirror neurons?

Colle, Becchio, and Bara [2008] proposed an account of the development of social understanding derived from research on mirror neurons. They claimed that mirror neurons allow us to overcome the problem of mind-body dualism and that such ‘a mechanism can account for dyadic sharing; infants are able to interact symmetrically and contingently with others well before being able to clearly distinguish between self and others’ representations’ (p. 345). Colle et al. went on to argue that ‘the 9-month revolution can be seen as the passage from dyadic sharing, neutral with respect to the self/other distinction, to triadic sharing, which takes into account the different roles and perspectives of other agents’ (p. 345). They proposed that this transition is ‘due to the emergence of an attribution mechanism, a “who” system, which allows the infant to attribute an action or intention to its proper owner’ (p. 346).

Colle et al. described the ‘problem of other minds,’ inherited from Descartes. They noted that Schopenhauer believed that ‘such a way of thinking “could only be found in a madhouse; as such it would then need not so much a refutation as a cure”’ (p. 337). We are sympathetic to their goal of resolving the problem of other minds, and to their attempt to root understanding in activity. However, there are problems at both of the steps in their model. We discuss the first in brief and the second at greater length.

In terms of the first step, Colle et al. should be commended for attempting to draw together the strands of recent analyses of mirror neurons in attempting to explain the range of dyadic skills in early infancy, many of which are overlooked in contemporary discussion. However, their discussion only scratches
the surface of the nature of dyadic skills that form the platform for later achievements [Reddy, 2008]. It is clear that the ability to distinguish actions by the self versus by others is essential for development, and, of course, there must be a neural basis for this. Yet this ability is important well before 9 months and would be involved in dyadic interaction. The development of a self-other distinction would not be possible without the ability to distinguish stimuli by the self from stimuli from others, and there is evidence for this ability at 4 months [Rochat & Striano, 2002] and even possibly in 4-week-olds or newborn infants [Rochat & Hespos, 1997]. Although it is important to think about the origin and development of skills in triadic interaction, an early form of the self-other distinction would be insufficient in itself to account for the process of coordinating perspectives referred to as triadic interaction.

Colle et al. argued that infants do not encounter the problem of other minds ‘because by observing other individuals acting, I not only observe a physical movement, but immediately share in the intention behind the action. By seeing their hand moving toward an apple, I immediately recognize what they are doing (“they’re trying to grasp”), but also that they want to grasp the apple, that is, their intention.’ They posited that, ‘this immediate capacity to share intention … depends at a basic neural level on the activation of shared representations, simultaneously activated in the minds of both agents’ (p. 337, emphasis in original). It is this assumption about the nature of triadic interaction that is the most problematic in their article.

Even if the intention associated with reaching toward an apple could be understood as wanting to grasp the apple, why the individual would want to grasp that apple could not be directly experienced through mirror neurons. That individual might want to eat the apple, check it for bruises before buying it, give it to someone, discard it as rotten, or any number of other purposes including juggling or using it as a target for archery. We need to be cautious about some of the strong claims that Colle et al. and others make regarding simply going from observing action to understanding the other’s intentions. This might work in apparently simple cases like a monkey grasping a nut, but in the case of understanding others’ gestures, having the same neurons fire when someone uses or observes a gesture would not necessarily help in understanding the meaning of the gesture.
The example of pointing is informative. Although describing it as ‘the simplest social action’ (p. 337), Colle et al. did not explain how mirror neurons would help in understanding its complexity. To illustrate this, consider the example of my (J.C.) wife pointing to a friend’s bag [Carpendale & Lewis, 2008]. I (J.C.) could follow her pointing gesture, and mirror neurons may well have been firing, but I did not understand why she was directing my attention to that object – that is, I did not understand the meaning she was attempting to convey. ‘Direct action understanding’ could not help in this very common form of human interaction. Moll and Tomasello [2007] provided a similar example in which we are asked to consider encountering a stranger in a hardware store looking at us and pointing to a bucket. It is not at all clear what this could mean – no matter how many mirror neurons are active – unless this is a friend who we have gone to the store with in search of a particular type of bucket.

The need for shared experience is shown by the study of Liebal, Behne, Carpenter, and Tomasello [2009] in which toddlers at 18 months showed an understanding that two people making the same pointing gesture to the same object can mean different things based on differences in their shared experience with the infant. The context of an action needs to be understood in terms of shared practices or routines of interaction that individuals are familiar with [Mead, 1922, 1934; Wittgenstein, 1968]. This starts early in infancy in the work we refer to above and explanations at the level of neurons firing need to be embedded in patterns of social engagement, drawing on a history of shared practice together in order to provide a complete account of the process through which meaning is conveyed. In moving in this direction of rooting social understanding in activity, Gallese [2007, p. 662], in contrast to mainstream cognitive science and consistent with Mead, suggested thinking of ascribing intentions as ‘predicting a forthcoming new goal.’

We, thus, feel that it is potentially misleading to talk about mirror neurons for understanding intentions and language. Similarly, it is important to be clear about what is meant when claiming that mirror neurons are the ‘neural basis’ of social understanding. Clearly there has to be a neurological side of the story – there would be no thinking without a brain, and mirror neurons are likely to be part of this story. However, there is no thinking or understanding, in the human sense, at the level of neurons. This is only possible at the level of persons in interaction with others. To
claim that mirror neurons are the neural basis of social cognition would be like thinking that once we have understood the elastic properties of bats and balls – the physical basis of the game – we would have an explanation of the game of baseball, and that we do not need to go further to understand the social and normative nature of rules, such as the implications of different players catching a fly ball.

As an important part in their account, Colle et al. speculated that the mirror neuron system is ‘probably present from early on in development’ (p. 337). But this leaves open the essential question of how this system emerges. Del Giudice, Manera, and Keysers [2009, p. 350] raised the question: are ‘mirror neurons (MNs) the result of learning processes or do they acquire their function by genetic pre-wiring?’ They noted that the ‘critical issue of how MNs could be pre-programmed to perform their task is rather unclear’ (p. 351, emphasis in original), and they argued that this system emerges through a Hebbian learning process of neurons developing stronger connections. We also have more sympathy for an account of mirror neurons that explains how they might become wired through development.

Colle et al.’s model assumes a simple transition from dyadic mirroring to triadic interaction, but their account seems to us to provide more smoke than insights about the functions of mirror neurons or the nature of social understanding. This is because in jumping from understanding another’s action such as grasping an apple to explaining social cognition they ignore how understanding the meaning of others’ actions is rooted in shared histories of interaction [Carpendale & Lewis, 2004, 2006, in press].

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References
African American emerging adults

Amnett and Brody respond to Hendry and Slaughter-Defoe

As we understand it, the purpose of Human Development’s ‘Editor’s Corner’ feature is to present new ideas that stir things up a bit and inspire fruitful exchanges among scholars. So, we are pleased to see that our essay ‘A fraught passage: the identity challenges of African American emerging adults’ has drawn comments from Lucifer himself (a.k.a. Leo Hendry) and Diane Slaughter-Defoe.

Hendry and Slaughter-Defoe have quite different approaches in their critiques, but their critiques have 2 points in common: (1) that conceptualizing a life stage of emerging adulthood glosses over the variability within the age period, and (2) that specifying identity issues as a central part of African American emerging adults’ development is problematic.

Variability during emerging adulthood

Stage theories have long been criticized for being too homogeneous and rigid [Elder & Shanahan, 2006; Lerner, 2006]. This criticism was well deserved. Freud, Piaget, Kohlberg, Levinson, and other 20th century stage theorists claimed too much for their theories. They sought to create theories that would apply universally, in all places and times, with little variation, yet they based their theories on small, local samples. Research eventually showed that the theories did not travel well when tested beyond the narrow bounds of their origins. By the end of the 20th century, stage theories were largely being rejected in favor of more process-oriented theories like the systems perspective mentioned by Hendry.

However, the exaggerated claims made by 20th century stage theorists should not be grounds for rejecting stage theories altogether, for all time. Stage theories can be useful heuristics, as long as they don’t attempt to be universal and invariable. Amnett has never claimed either universalism or invariability for emerging adulthood theory. On the contrary, it has been emphasized from the beginning that heterogeneity is one of the defining features of emerging
adulthood. Emerging adults don’t have the normative institutional frameworks of family and school as they did in childhood and adolescence, or a new family and stable work as most will past age 30. Consequently, during emerging adulthood they follow all sorts of different, changeable paths in love and work.

Does this heterogeneity make it difficult or even impossible to speak of emerging adulthood as a definable life stage? Hendry and Slaughter-Defoe seem to think so; we disagree. In fact, they seem to wish to dispense with life stages altogether, because terms for life stages seem to them to gloss over the heterogeneity within each stage. But the fact is, it is very difficult to talk about human development without referring to life stages. Talk of processes can be useful, but the forms processes take are different at different life stages. For example, attachment is a process that applies to human relationships at all ages, but the attachment between an infant and a parent is vastly different than an attachment between middle-aged marriage partners. Trying to avoid applying ideas about processes without reference to life stages quickly becomes too abstract and too disconnected from how people actually live and from how people change with age. Infancy really is different developmentally from early childhood; adolescence really is different developmentally from emerging adulthood. Trying to avoid using stage terminology in discussing development obscures rather than illuminates.

Although Arnett [2004] has proposed five features of emerging adulthood based on his research with American samples diverse in SES and ethnicity (including many African Americans), these features were not proposed as universals, and in fact he has promoted the exploration of the different forms emerging adulthood may take in different cultural and SES groups [Arnett, 2006, 2007]. The validity of the 5 features is open to empirical test, and other groups may have developmental features in emerging adulthood that are distinctive to their own culture [e.g., Facio & Micocci, 2003; Nelson & Chen, 2007]. What is well established and widespread is that dramatic changes have taken place in the past half century in the nature of the age period from the late teens to the late twenties. Previously, this was a time of entering a stable adulthood by making the commitments that formed the structure of an adult life: long-term work, marriage, and parenthood. Now these years are highly unstable with regard to work, and marriage and parenthood do not take
place for most people until the late twenties or early thirties. This makes the period from the late teens to the twenties entirely different from what they were in the past.

Exactly how these years are different, and in what ways they differ among different cultural groups, it is our challenge as researchers and scholars to find out. But we should start with the common realization that the age period has indeed changed, for virtually all groups. Longer education, more frequent job changes, and later ages of marriage and parenthood apply to the working class as well as the middle class, to African Americans as well as Whites, and to every industrialized country in the world. Consequently, it seems warranted to declare the rise of a new life stage, as Arnett has done with the theory of emerging adulthood. Using the emerging adulthood framework is valuable because it draws attention to this new life stage and promotes the investigation of it [Arnett, 2007].

Identity issues of African American emerging adults

Both Hendry and Slaughter-Defoe object to applying ideas about identity development to African American emerging adults. Hendry objects because, in his view, ‘identity formation is a lifelong challenge,’ and people in middle age experience changes such as divorce and grandparenthood that reflect and promote identity development. But it remains true that the emerging adult years are the time of greatest flux in love and work. People of other ages can also change jobs and change love partners, of course, but emerging adulthood is when the frequencies of changes are highest, because it is the time when a relatively stable identity is still being formed [Arnett, 2004]. This makes emerging adulthood distinct from other life stages.

Slaughter-Defoe objects to the application of identity issues to African Americans because ‘White Americans no longer constitute the standard against which any group, including African Americans, should compare themselves.’ But there is nothing especially White or American about the identity concept. Erikson’s identity theory was culturally grounded from the beginning [Erikson, 1950], and his original exposition of it contained lengthy illustrations from two Native American cultures. Unlike other stage theorists of his time, he did not rely mainly on local samples for his ideas.
Today, identity theory is much broader than Erikson. Theorists of globalization have made identity concepts central to their analysis of the psychological changes that have taken place worldwide in recent decades as people have increasing contacts with cultures other than their culture of origin [e.g., Giddens, 2000]. This cultural grounding makes the identity concept especially apt for analyzing the development of any specific cultural group, including African American emerging adults. We hope our essay has provided an example of how this might be done.

Conclusion

The value of any theory is that it assembles existing evidence in a new way that inspires new directions for research. That is what the theory of emerging adulthood has done. Hundreds of scholars around the world are now using the emerging adulthood paradigm, as has been evident at the conferences on emerging adulthood held so far (see www.ssea.org), so it is clearly inspiring research. Whoever finds it a useful heuristic is welcome to use it; whoever does not is welcome to try to find some other way of making sense of what is happening developmentally today among young people from the late teens to the late twenties.

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References


