Alternate developmental research directions

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This paper addresses the question of whether it is worthwhile for developmentalists to try and figure out the age at which a particular skill develops. First, I discuss why it is important to study the earliest appearance of skills. Then I mention some of the problems with some approaches to such studies and also try to point some areas where such research is not the only thing they can do. Finally, I outline some additional things developmentalists can do in addition to this, such as studies investigating learning vs. development, genetic influence, skill combining and last appearance of a skill.

Why should developmentalists study ages of skill development

Many of the developmental studies have been concentrated on finding out the age at which a particular skill first appears (quite a few papers from the reading packet for this class, which I won’t list here). I will list a few reasons why such studies are important and should not be discontinued (this is by no means an exhaustive list). One important use of these studies is in the field of education. If we know when a child first acquires a particular skill, we can work on teaching him applications of that skill or encourage him to practice beneficial skills so that they grow stronger. The other side of the same coin is that parents can be warned to be extra careful during a particular age when the child is most sensitive to learning harmful skills. Another reason for such studies is that it gives us more insight into human development and helps finding causal and temporal links among various behavioral phenomena.
Difficulties in such studies

External behavior insufficient: Most of the time, we have only the external behavior of humans to suggest the inner development of a skill. Going from apparent behavior to actual internal structures is very difficult. An example of such an ambiguity is that it is difficult to distinguish, solely through external behavior, between a person who is mute because of physical reasons and a person who has chosen to remain silent for other reasons (from Turkheimer (1998)). There is very little we can do to judge whether the capability to speak exists in either one from external behavior.

Individual differences: Some skills which appear early in somebody may appear at a much later age in somebody else. There is often variability in the age at which a particular skill appears among different children. Many reasons exist for such variability. Some of them, mentioned in Gelman & Williams (1998) are random noise, different learning solutions for same underlying structures, different task demands, cultural differences, differences in planning ability or an actual lack of competence.

Unclear what tasks are measuring: Many of the tasks that attempt to test for the existence of a particular skill obtain results which can have multiple interpretations. One such example is the Rabbit task test done by Baillargeon & Graber (1987). Bogartz, Shinskey & Speaker (1997) propose multiple possible explanations of the same results. It is very difficult to design tasks which will eliminate as many confounding variables as possible.

Domain specific appearance: A skill may show up in one domain but nowhere else. Do we consider the appearance of that skill as an indication of development of that skill for any kind of use or do we consider it to be a domain-specific development? Alternately stated, should we be looking for elements of the set of (skills) or from a set of (skill, domain) pairs?
Learning or Development: There is also the issue of how do we distinguish learning from development. By learning, I mean skills that have been acquired with external help and by development, I mean structures that appear as the process of “growing up”. Related to some of the earlier points, we cannot distinguish between the absence of a skill and the scenario in which the skill is present but its application has never been learnt. In the opposite direction, a behavior may result either because of a skill which developed or a strategy that the child learnt to produce the same external behavior. An example is that just a child may know “2 + 2 = 4” either because she understands the principles of counting or just because she has memorized this as a fact. The bottomline is that there are convergent and divergent ambiguities involved in trying to go between external behavior and internal structures.

Some other issues that theories of cognitive development must address are outlined at the end of page 597 of Gelman & Williams (1998).

Other things they can study:

One way of looking at development and learning is as follows. We can think of development as genetically determined “sensitive periods” of learning some skills. Actual experiences of the child may determine whether these sensitive periods show up earlier because of favorable kinds of experiences/environment. Also, some experiences may delay or inhibit the appearance of this sensitive period altogether. In some way, the appearance of these sensitive periods adapt to the experiences of the child. Then, we can think of learning as the actual instances of figuring out the applications of these skills and this happens most quickly during the sensitive periods.

One way of looking at this is that genetics constrains the number of paths available for learning skills. Then, experience and environment determine which of these developmental paths is followed. Finally, practice, education and domain-specific experiences at critical periods of devel-
opmental time determine which of these skills grow stronger and manifest themselves to the external world (and in which domains they do so).

**Interaction of learning and development**

So, one thing developmentalists could do is to further study the interaction of learning and development and see how long after a skill manifests itself in one domain does it appear in other domains. Further, can we design tasks so that we can induce transfer of learning in one domain to application in another domain by providing the right kind of experiences to the child?

**Genetically determined vs. Environment influenced development**

Another direction of study which follows from the discussion above is to see how much of development is genetically determined (innate) and how much of it is influenced by the environment and instruction. This kind of research will be useful for educators and parents who want to “customize” the experiences of the child to encourage particular behavior or discourage him from others. This is similar to Vygotsky’s theory of providing experiences in the zone of proximal development.

**Combination of skills rather than first appearance**

Another thing that developmentalists can do is to study when different skills are combined to form “higher-level” skills. Thus, we can try to determine the number of skills that can be combined at a given age range. This will give us a clue as to how many elements the brain can process at a given age and also a developmental graph of how these grow and diminish. Recursively speaking, maybe the skill to combine two skills itself is a skill that is acquired at a particular age and it would be interesting to see when such meta-skills appear. One such study in this direction is reported by Hock, Park & Bjorklund (1998) in which they investigate how two strategies are combined when attempting to solve a problem.
Last appearance of a skill

In one of the class discussions, Hugh Bishop mentioned a thought whether there is a age after which the number of skills start getting ‘un-learned’. People may not only start losing their ability to learn new skills in a particular domain, they might start forgetting skills they learnt in that domain. So, it might be interesting to study adults of various age and see if skills do indeed disappear after a certain age. I don’t know if there will be any particular use of such studies, but they may result in some interesting findings and also take us one step further towards understanding development.

Conclusions

Although studies trying to find the position of first appearance of a skill on the timeline are interesting in themselves, there are some difficulties involved in this process. Also there are different questions that developmentalists can be asking to get different directions of research which may give new perspectives at looking at development and lead to other significant findings. I outlined some of the other possible directions of research in this paper, some of which are already being followed by researchers and others which may lead to interesting findings.

References


