【1. **Introduction to Children’s Thinking**】

**1. What does it mean to say that a child is in a particular stage? Why do some theorists believe that development occurs in stages whereas others do not?**

* What does it mean to say that child is in a particular stage?

What exactly *do* we mean when we say that children’s thinking progresses through

stages? Flavell (1971) noted four key implications of the stage concept. **First, stages imply**

***qualitative changes.*** We do not say that a boy is in a new stage of understanding of arithme

tic when he progresses from knowing 50 percent of the multiplication facts to knowing 75

percent of them. Instead, we reserve the term for situations in which the child’s thinking

seems not only better but also different in kind. For example, when a girl makes up her

first genuinely amusing joke after several years of telling stories that she calls jokes, but

that do not even make sense to adults, it seems like a qualitative change. However, note

the ambiguity of the term *seems like*. Perhaps the girl’s efforts had been improving slowly

for a long time but had not quite reached the threshold for what an adult recognizes as a

joke. To some degree, what constitutes a qualitative change is in the eyes of the beholder.

**A second implication of stage theories, which Flavell labeled the *concurrence***

***assumption,* is that children make the transition from one stage to another on many**

**concepts simultaneously**. When they are in Stage 1, they show Stage 1 reasoning on all

of these concepts; when they are in Stage 2, they show Stage 2 reasoning on all of them.

As a result of these concurrent changes, children’s thinking shows abstract similarities

across many domains. **A related assumption of stage theories is *coherent organization.***

The child’s understanding is viewed as being organized into a sensible whole, rather

than being composed of many independent pieces of knowledge.

**A final implication of stage theories, which Flavell called the *abruptness assump***

***tion,* is that children move from one stage to the next suddenly rather than gradually.**

Put another way, the periods in which children are viewed as being “in” stages are

lengthy, whereas the transitions between stages are brief. Thus, children are in Stage

1 for a prolonged period of time, enter briefly into a transition period, and are then in

Stage 2 for a prolonged period, and so on.

* Why do some theorists believe that development occurs in stages whereas others do not?

**The view of development as stage-like was in part inspired by the ideas of Charles**

**Darwin (1877).** Darwin is not usually thought of as a developmental psychologist,

but in many ways, he was one. In his book *The Descent of Man*, Darwin discussed the

development of reason, curiosity, imitation, attention, imagination, language, and self

consciousness. Not surprisingly, he was most interested in how these competencies

emerged in the course of the evolution from earlier-appearing animals to humans.

However, many of his ideas could be, and were, translated into concepts about the

development that occurs in an individual human lifetime.

**Perhaps Darwin’s most influential observation was his most basic: that over the**

**vast period of time that living things have populated the earth, they have evolved**

**through a series of qualitatively distinct forms.** This observation suggested to some

that development within a given lifetime also progresses through distinct forms or stages. **Unlike Darwin, however, developmental theorists who adopted an evolu**

**tionary perspective further hypothesized that children would make the transition**

**from one stage to the next quite suddenly. This stage approach directly contradicted**

**speculations by associationist philosophers, such as John Locke, that children’s**

**thinking develops through the gradual accretion of innumerable particular experiences. Associationists compared the developmental process to a building being**

**constructed brick by brick; stage theorists compared it to the metamorphosis from**

**caterpillar to butterfly.**

In the early part of the twentieth century, **James Mark Baldwin** (1861–1934) pro

posed a set of plausible stages of intellectual development. He suggested that chil

dren progressed from a sensorimotor stage, in which sensory observations and motor

interactions with the physical environment were the dominant form of thought, to a

quasilogical, a logical, and finally a hyperlogical stage. The idea that children prog

ress through these stages is consistent with everyday observations of children. Infants’

interactions with the world do seem, at least at first impression, to emphasize sen

sory input and motor actions. And not until adolescence do children spend much time

thinking about purely logical issues, such as whether laws that apply to them, such

as those regarding driving, voting, and drinking alcohol, are logically consistent with

each other. Baldwin’s stage theory was ignored by most of his contemporaries, but it

exerted a strong influence on at least one later thinker: Jean Piaget.

Without question, Piaget added more than any other individual to our understanding of children’s thinking. As described in Chapter 2, he made a huge number of fascinating observations about the ways in which children think at different ages, and he proposed some seminal ideas about developmental change that continue to inspire subsequent research. Piaget also developed the notion of “stage” to a much greater extent than Baldwin had, and he proposed a highly influential stage theory of intellectual development.

**Thus, stage theories depict development as involving qualitative change,**

**occurring simultaneously for many concepts, occurring suddenly, and involving a**

**transition from one coherent way of thinking to a different coherent way of thinking.**

children’s overall capabilities don’t change too much during a long period.

Developmental theorists who adopted an evolutionary perspective further hypothesized that children would make the transition from one stage to the next quite suddenly.

This stage approach directly contradicted speculations by associationist philosophers, such as John Locke, that children’s thinking develops through the gradual accretion of innumerable particular experiences.

Stages imply a qualitative change, but everyone has a their own view of quality change. stage theories depict development as involving qualitative change, occurring simultaneously for many concepts, occurring suddenly, and involving a transition from one coherent way of thinking to a different coherent way of thinking.

1. **Longitudinal studies, such as Werner’s study that is described on pp 1-2, play a very large role in developmental psychology, though there are far fewer of them than of cross-sectional studies. What are longitudinal studies, why are they so much more common in developmental psychology than in other areas of psychology, and why are there far fewer of them than cross sectional studies?**

* What are longitudinal studies?

In a longitudinal study, researchers repeatedly examine the same individuals to detect any changes that might occur over a period of time.

In a longitudinal study subjects are followed over time with continuous or repeated monitoring of risk factors or health outcomes, or both.

* why are they so much more common in developmental psychology than in other areas of psychology

(可以方便观察行为，模式等等的变化，

在纵向研究中，研究人员不操纵任何变量或干扰环境。不受样本个体差异的影响。

纵向研究持续时间超过一个时刻，使研究人员能够发现变量之间的因果关系。)

In longitudinal studies, researchers do not manipulate any variables or interfere with the environment. Instead, they simply conduct observations on the same group of subjects over a period of time.

Unlike [cross-sectional studies](https://www.simplypsychology.org/what-is-a-cross-sectional-study.html) that measure a moment in time, longitudinal studies last beyond a single moment, enabling researchers to discover cause and effect relationships between variables.

They are beneficial for recognizing any changes, developments, or patterns in the characteristics of a target population. Longitudinal studies are often used in clinical and developmental psychology to study shifts in behaviors, thoughts, and emotions as well as trends throughout a lifetime.

## Advantages

###### ****Allows researchers to look at changes overtime****

Because longitudinal studies observe variables over extended periods of time, researchers can use their data to study developmental shifts and understand how certain things change as we age.因此研究人员可以使用他们的数据来研究发展变化并了解某些事物如何随着年龄的增长而变化。

###### ****High validation****

Since objectives and rules for long-term studies are established before data collection, these studies are authentic and have high levels of validity.

###### ****Eliminates recall bias****

Recall bias occurs when participants do not remember past events accurately or omit details from previous experiences.当参与者不能准确地记住过去的事件或忽略以前经历的细节时，就会出现回忆偏差

###### ****Flexibility****

The variables in longitudinal studies can change throughout the study. Even if the study was created to study a specific pattern or characteristic, the data collection could show new data points or relationships that are unique and worth investigating further.纵向研究中的变量可以在整个研究过程中发生变化。即使该研究是为了研究特定模式或特征而创建的，数据收集也可以显示独特且值得进一步研究的新数据点或关系

## Limitations

###### ****Costly and time consuming****

Longitudinal studies can take months or years to complete, rendering them expensive and time consuming. Because of this, researchers tend to have difficulty recruiting participants, leading to smaller sample sizes.

**Large sample size needed**

Longitudinal studies tend to be challenging to conduct because large samples are needed for any relationships or patterns to be meaningful. Researchers are unable to generate results if there is not enough data.

**Participants tend to drop out**

Not only is it a struggle to recruit participants, but subjects also tend to leave or drop out of the study due to a variety of reasons such as illness, relocation, or a lack of motivation to complete the full study. This tendency is known as selective attrition and can threaten the validity of an experiment. For this reason, researchers using this approach typically recruit many participants fully expecting that a substantial number will drop out before the end.

**Report bias is possible**

Longitudinal studies will sometimes rely on surveys and questionnaires which could result in inaccurate reporting as there is no way to verify the information presented.

* why are there far fewer of them than cross sectional studies?

Longitudinal studies and cross-sectional studies are two different observational study designs where researchers are analyzing a target population without manipulating or altering the natural environment in which the participants exist.

Yet, there are apparent differences between these two forms of study. One key difference is that longitudinal studies follow the same sample of people over an extended period of time while cross-sectional studies look at the characteristics of different populations at a given moment in time.

Longitudinal studies tend to require more time and resources, but they can be used to detect cause-and-effect relationships and establish patterns among subjects.

Cross-sectional studies, on the other hand, tend to be cheaper and quicker but are only able to provide a snapshot of a point in time and thus cannot identify cause-and-effect relationships.

**纵向设计**

纵向方法包括在相当长的一段时间内（通常至少一年）跟踪相同的儿童，并在这段时间内定期观察这些儿童发展的变化和持续性。本章开头关于考艾岛儿童从出生前到40岁的发展的研究是纵向研究的一个例子。纵向方法可以告诉我们的另一个很好的例子是Brendgen及其同事（2001年）对孩子在同学中的受欢迎程度的调查。从7岁到12岁，每年都会对每个孩子的受欢迎程度进行调查。在这一时期，大多数儿童的受欢迎程度相当稳定；在绝大多数年份，少数儿童受欢迎，其他儿童则不受欢迎。同时，一些个体表现出了年复一年的独特统治模式变化；同一个孩子可能在8岁时受欢迎，10岁时不受欢迎，12岁时平均受欢迎。关于个体差异随时间变化的稳定性以及儿童个体变化模式的信息只能通过纵向设计获得。

如果纵向设计对于揭示稳定性和随时间变化非常有用，为什么横截面设计更常见？原因主要是实际的。对同一个孩子进行长期研究涉及到在每次重新检查时定位孩子的困难任务。不可避免的是，一些孩子会因为其他原因离开或停止参与。这种参与者的流失可能会使研究结果的有效性受到质疑，因为没有继续参与的儿童可能与全程参与的儿童不同。纵向设计有效性的另一个威胁是重复测试的可能影响。例如，反复进行lQ\_tests可以让孩子熟悉测试项目的类型，从而提高孩子的分数。由于这些原因，纵向设计主要用于主要问题是单个儿童的稳定性和随时间变化的问题，这些问题只能纵向研究。当核心发展问题涉及典型表现中与年龄相关的变化时，更常用横截面研究。

1. **Adoption studies of children who had varying amounts of time in harsh orphanages in Romania and other countries have illuminated the roles of nature and nurture in several aspects of child development? What do you consider the main contributions of these studies?**

* The roles of nature and nurture in several aspects of child development.?

Simply put, the question was whether human nature is sufficiently flexible that the Romanian-born children could overcome the extreme deprivation of their early experience, and if so, would that flexibility decrease with the children's age when they were adopted and with the length of their deprivation.（简言之，问题是人性是否足够灵活，罗马尼亚出生的儿童是否能够克服其早期经历的极端剥夺，如果是，这种灵活性是否会随着儿童被收养时的年龄和剥夺时间的长短而减少。

）

为了评估早期剥夺对孩子在身体/智力以及社交方面的影响，研究对比了6个🈷月之前被英国家庭领养的孩子/更大年龄被领养的孩子/和英国本地出生的孩子在6岁时接受了身体、智力和社会发展的测试

到6岁时，罗马尼亚出生的儿童的身体发育无论从绝对值还是与英国出生的对照组相比都有了显著改善。然而，罗马尼亚儿童早期被剥夺的经历继续影响他们的身体发育，负面影响的程度取决于儿童被收容的时间长短。罗马尼亚出生的孩子在6个月之前被英国家庭收养，因此他们在孤儿院度过了最短的生命，他们的体重与英国出生的孩子6岁时的体重差不多。然而，罗马尼亚出生的儿童在6至24个月之间被收养，因此他们在孤儿院度过了更多的早期生活，体重较轻而那些年龄在24至42个月之间收养的婴儿体重甚至更低（Rutter等人，2004年）。

6岁时的智力发展表现出类似的模式。罗马尼亚出生的孩子在6个月前被收养，他们的智力水平相当与那些英国出生的群体。那些在6至24个月之间被领养的儿童表现稍差，而那些在24至42个月之间领养的孩子表现更差（Rutter等人，2004年）。6个月后收养的罗马尼亚儿童在11岁时再次接受测试时，智力缺陷同样严重，这表明早期剥夺的负面影响在他们被收养到充满爱心的家庭后持续多年（Beckett等人，2006年；Kreppner等人，2007年）。长期存在的智力问题包括视觉记忆和注意力受损（Pollak，Nelson等人，2010年）。

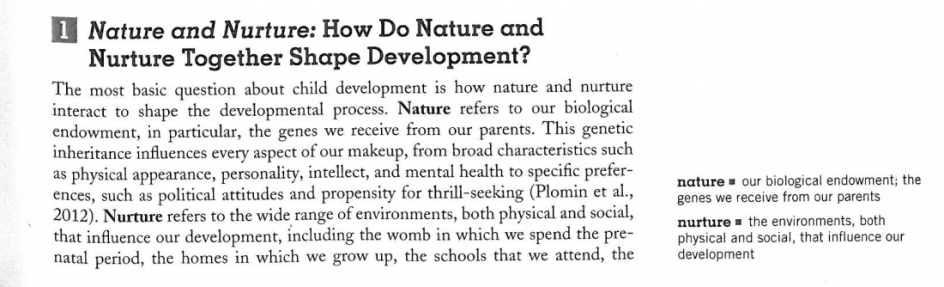
孤儿院的早期经历对儿童的社会发展产生了相当大的破坏性影响（Kreppner等人，2007年）。在6个月后被领养的罗马尼亚出生儿童中，近20%在6岁时表现出极其异常的社交行为，例如在引发焦虑的情况下不看父母，并愿意与陌生人交往（而在英国出生的对照组中，有3%的人这样做）。即使在15岁和成年早期，许多人也难以控制自己的情绪和建立友谊（Rutter等人，2009年）。这种非典型的社会发展伴随着异常的大脑活动。儿童8岁时的脑部扫描显示，在孤儿院生活了很长一段时间后领养的儿童的杏仁核神经活动水平异常低，杏仁核是一个涉及情绪反应的大脑区域（Chugani等人，2001年）。随后的研究发现，在俄罗斯和东亚的劣质孤儿院中度过早期生活的儿童中存在类似的大脑异常（Nelson等人，2011年；Tottenham等人，2010年）。

这些发现反映了儿童发展的一个基本原则，这一原则与人性的许多方面有关，本土主义者和经验主义者也同意这一点：体验的时间会影响其效果。在本案中，如果剥夺在6个月大时结束，儿童有足够的灵活性来克服生活在没有爱、呆板的机构中的影响在机构中生活直到

然而，年龄越大，影响就越难以克服，即使孩子们在随后的许多年里都生活在充满爱和刺激的环境中。收养家庭显然对孩子的生活产生了巨大的积极影响，但收养年龄越晚，早期剥夺的长期影响越大。

* What do you consider the main contributions of these studies?

This research reflect a abasic principle of children development that is relavent to many aspect of human nature and and about which nativists and empiricists agree: The timing of experiences influences their effects. In the present case, children were sufficiently flexible to overcome the effects of living in the loveless, stultifying institutions if the deprivation ended by age 6 months; living in the institutions until older ages, however, had effects that were rarely overcome, even when children spent many subsequent years in loving and stim- ulating environments. The adoptive fami- lies clearly made a huge positive difference in their children's lives, but the later the age of adoption, the greater the long-term effects of early deprivation.

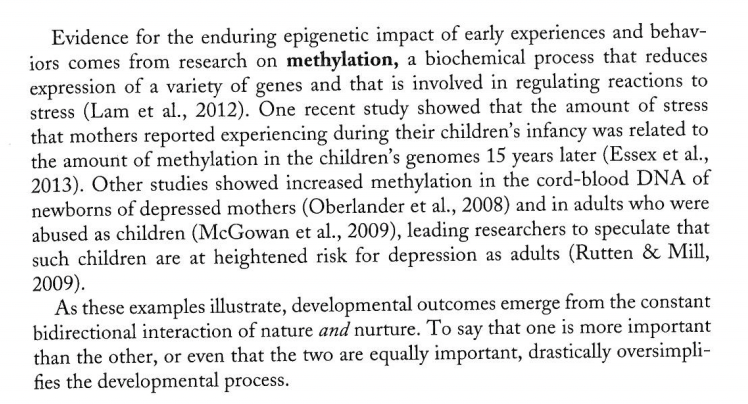


大自然指的是我们的生物禀赋，特别是我们从父母那里获得的基因。这种基因遗传影响着我们构成的方方面面，从广泛的特征，如外表、个性、智力和心理健康，到特定的偏好，如政治态度和寻求刺激的倾向（Plomin等人，2012）。养育指的是影响我们发展的各种各样的环境，包括身体和社会环境，包括我们在子宫中度过的产前阶段、我们成长的家庭、我们就读的学校、我们的家庭和我们的家庭

流行的描述通常将先天-后天问题呈现为一个非此即彼的命题：“是什么决定了一个人的发展、遗传或环境？”然而，这种“非此即彼”的说法具有严重的误导性。**所有人类特征——我们的智力、人格、外表和情感——都是通过自然和后天的共同作用创造的，也就是说，通过基因和环境的不断相互作用。同样，发展主义者不是问自然还是后天更重要，而是问自然和后天如何共同塑造发展。**

正如这些例子所说明的，发展成果来自于自然和养育的持续双向互动。如果说其中一个比另一个更重要，甚至说两者同等重要，这就大大简化了发展过程。





1. **In what ways do children shape their own environments? How might such “environment shopping” contribute to the finding that with age, comparisons of twins of differing degrees of relatedness (identical twins, fraternal twins, siblings, cousins, parent and child, etc.) who are raised apart indicate a growing contribution of genetics to individual differences and a decreasing contribution of shared environment?**

孩子们如何塑造自己的环境？这样的“环境购物”会如何促成这样的发现：随着年龄的增长，对不同亲缘程度的双胞胎（同卵双胞胎、异卵双胞胎，兄弟姐妹、表兄弟姐妹、父母和孩子等）的比较表明，遗传对个体差异的贡献越来越大，而共享环境的贡献却越来越小？

【2. **Piaget’s Theory**】

1. **Why has Piaget’s theory endured so long?【Piaget’s Theory】**

Perhaps the most basic reason is that Piaget’s theory communicates an almost tangible sense of what children’s thinking is like.

His descriptions feel right. Many of his individual observations are quite surprising, but the general trends he describes appeal to our intuitions and to our memories of childhood.

A second important reason is that the theory addresses topics that have been of interest to parents, teachers, scientists, and philosophers for hundreds of years.

The 3ed is exceptional breadth and achievements at any given age.

A fourth reason for the theory’s having endured is that Piaget had the equivalent of a gifted gardener’s “green thumb,” a knack for making interesting observations.

5. Interesting

皮亚杰研究的重点是儿童智力发展，他的理论贡献主要有：1.提供了一套完整的、富有辩证思想的关于儿童智力发展的理论；2.描述了个体从出生到青年初期智力发展的路线；3.第一次将数理逻辑作为划分儿童逻辑思维发展工具。4.构造了发生认识论的理论框架。5.创造了一套研究儿童智力发展的独特理论。

皮亚杰研究心理发展的方法主要是临床法，所谓的临床法就是设置一定的任务要求儿童完成，研究者边观察儿童的行为边和他们进行交谈的一种研究方法。

【3. **Information Processing Theories**】

1. **What similarities unite information processing theories?【Information Processing Theories 】**

**Describe basic assumptions of information-processing theories.**

Information-processing theories of development vary among themselves, but all

share several basic assumptions. **The most fundamental assumption is that *thinking***

***is information processing*.** Rather than focusing on stages of development, information

processing approaches focus on the information that children represent, the processes

that they apply to that information, and the memory limits that constrain the amount

of information they can represent and process. Cognitive development is analyzed in

terms of age-related and experience-related changes in these capabilities. As a con

sequence, information-processing analyses generally characterize knowledge in more

detail than do stage approaches or sociocultural approaches (which we will consider

in Chapter 4).

**A second defining characteristic of information-processing theories of development is an emphasis on *precise analysis of change mechanisms*.** Two critical goals

are to identify the change mechanisms that contribute most to development and to

specify exactly how these mechanisms work together to produce cognitive growth.

This emphasis on how change occurs also highlights the cognitive limits that prevent

change from occurring more rapidly than it does. Thus, information-processing theo

ries attempt to explain both how children of given ages have come as far as they have

and why they have not gone further.

**A third assumption of most information-processing approaches is that *change is pro***

***duced by a process of continuous self-modification*.** That is, the outcomes generated by the

child’s own activities change the way the child will think in the future. For example, using

a procedure to solve a problem can generate knowledge about its effectiveness, which can

then lead to shifts in how often that procedure is used. Such self-modifying processes

eliminate the need to account for special age-defined transition periods, as in Piaget’s

proposed transition from the concrete operations to the formal operations stage around

age 12. Instead, children’s thinking is viewed as continuously changing at all ages.

**All cognitive theories must come to grips with two basic characteristics of human**

**cognition. First, our thinking is limited,** both in the amount of information that we can

attend to simultaneously and in the speed with which we can process the informa

tion. **Second, our thinking is flexible,** capable of adapting to constantly changing goals,

circumstances, and task demands. Information-processing theories have attempted to

come to grips with this dual nature of cognition by focusing on both structural char

acteristics, which determine the limits within which thinking occurs, and processes,

which provide the means for flexible adaptation to a constantly changing world.

Along with these commonalities, information-processing models also vary in

important ways. One is their scope. Some theories present a broad framework about

how the cognitive system, as a whole, is structured, and how it functions and changes

over time and with experience. Other theories focus on performance and change

within a single domain or on a single task.

Another way that information-processing theories vary is in their use of formal

models. Some use relatively informal representations, such as flowcharts or box-and

arrow diagrams, that specify the flow of information as a person completes a task.

Others use *computational models* that simulate performance and change due to learning

and development.

Computational models are mathematical models that simulate processes in the natu

ral world using computer software in order to better understand those processes and to

predict future outcomes. Such models are used in many fields to simulate the behavior

of systems that have many interacting components and to make predictions about the

future. For example, computational models of weather systems are used to forecast the

paths of storms, and computational models of plate tectonics are used to predict the occur

rence of earthquakes. In a similar way, computational models of psychological processes

are used to predict cognitive performance and learning in a range of tasks and settings.

Such models specify the processes by which a system transforms inputs into outputs. The

code that specifies these processes can be run on a computer so that the behavior of the

system can be observed under a variety of conditions, which are simulated by varying

the inputs to the model. Computational models are widely used by researchers who take

an information-processing perspective on psychology, and in recent years, there has been

enormous growth in the use of computational models to study cognitive development

(see Schlesinger & MacMurray, 2012; Shultz, 2013; Simmering, Triesch, Deak, & Spencer,

2010). Different types of computational models simulate cognition at different grain sizes

and represent fundamental cognitive structures and processes in different ways.

1. **What issue with textbook problem input contributes to children's difficulty in solving mathematical problems? How does this impact children's output? Explain how this relationship between textbook input and child output is reflected in children’s performance on fraction problems requiring a measurement interpretation. 【Information Processing Theories 】**

<https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544>

* What issue with textbook problem input contributes to children's difficulty in solving mathematical problems? How does this impact children's output?

为了评估教科书中的分数算术问题，[布雷思韦特等人。(2017)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)对美国三本流行的数学教科书系列的四到六年级卷中提出的所有符号有理数算术问题进行编码：培生教育的enVisionmath ([查尔斯等人。2012](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544))，霍顿·米夫林·哈考特的GO MATH！([狄克逊等人。2012a](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),b) 和 McGraw Hill Education 的日常数学(Univ. Chic. Sch. Math. Proj.[2015a](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)-C）。问题都是那些（a）有两个操作数，其中至少一个是分数或混合数；( b ) 是符号形式的（即，不是文字问题）；( c ) 需要准确的答案（即，不是估计）。具有这些特征的问题构成了我们分析的所有三本教科书以及其他三个教科书系列中的大部分问题。[卡迪等人。(2015)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544). 一项调查[Opfer 等人。(2018)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)表明所审查的教科书[布雷思韦特等人。(2017)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)是四个最广泛使用的教科书系列中的三个。

分析揭示了算术运算与问题中的操作数（数字）之间的显着非随机关系。首先，考虑涉及两个分数的分数算术问题。如图所示[表格1](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)，在上述三个教科书系列的四年级到六年级的卷中，只有 4% 的乘法和除法问题具有相等的分母（例如，3/5 × 4/5）。相比之下，在相同的教科书中，50% 的加法和减法问题具有相同的分母（例如，3/5 + 4/5）。

[三本教科书a](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544" \l "t1_fn_a" \o "脚注)中组合项目的算术运算和分母相等分类的两个分数操作数问题的百分比

其他类型的不平衡也出现在教科书中分数算术问题的分布中。考虑具有一个分数和一个整数的问题的分布 ([表 2](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)）。在至少有一个分数操作数的教科书中，只有 4% 的加减法问题还包括整数操作数（例如，6 - 3/5）。相比之下，59% 的至少有一个分数操作数的乘法和除法问题也有一个整数操作数（例如，6 × 3/5）。

从三本教科书的组合项目中按算术运算和操作数类型（两个分数或一个分数和一个整数）分类的问题的百分比[a](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544" \l "t2_fn_a" \o "脚注)

这些不平衡的问题分布没有任何明显的数学依据。学习者需要能够将具有相同分母的分数相乘，就像他们需要能够将具有不等分母的分数相乘一样。学习者还需要能够加减整数和分数，就像他们需要能够乘法和除法一样。

孩子们学习问题输入的特征吗？

教科书和家庭作业问题的分布有偏差这一事实并不意味着孩子们学会了这些偏差。事实上，有理由相信他们不会。数学教学强调一般原则和程序，而不是问题的分布；同样，教科书或教师也没有明显的理由让学生注意问题的不平衡分布。The fact that distributions of textbook and homework problems are biased does not mean that children learn the biases. Indeed, there was reason to believe that they would not. Mathematics instruction emphasizes general principles and procedures, not distributions of problems; also, there would be no obvious reason for textbooks or teachers to call students’ attention to imbalanced distributions of problems.

为了确定孩子们是否了解了课本中问题的分布，[布雷思韦特和西格勒 (2018)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)向六年级和八年级学生提出了两种互补类型的问题。选择运算问题指定操作数并要求孩子选择可能伴随他们的算术运算（例如，3/5 □ 2/5）。生成操作数问题指定一个算术运算并要求孩子选择两个可能伴随它的数字（例如，□ × □）。孩子们被告知，这两个数字在一半的问题上应该是两个分数，在另一半的问题上应该是一个分数和一个整数。To determine whether children learned the distributions of problems in their textbooks, [Braithwaite & Siegler (2018)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544) presented sixth and eighth graders with two complementary types of problems. Choose-operation problems specified operands and asked children to choose an arithmetic operation that was likely to accompany them (e.g., 3/5 □ 2/5). Generate-operand problems specified an arithmetic operation and asked children to choose two numbers that were likely to accompany it (e.g., □ × □). Children were told that the two numbers should be two fractions on half of the problems and a fraction and a whole number on the other half.

孩子们清楚地了解了教科书中存在的虚假运算符 - 操作数关联。在 generate-operands 任务中，当指定的运算是加法或减法时，孩子们通常会生成分母相等的分数对。当指定的运算是乘法或除法时，它们通常会生成带有整数和分数的操作数对。同样，在选择运算任务中，当呈现两个分母相等的分数时，孩子们选择加法或减法的次数多于乘法或除法；当呈现一个整数和一个分数时，他们选择乘法或除法而不是加法或减法。孩子们甚至学会了最有可能出现的特定分数（例如，3/4、7/8 或 2/3）。r = 0.78。因此，孩子们非常擅长学习数学上与教学输入无关的特征，例如运算和操作数之间的关系以及特定分数的频率。不幸的是，他们不太擅长学习所需的程序和概念。Children clearly learned the spurious operator–operand associations that were present in textbooks. On the generate-operands task, when the specified operation was addition or subtraction, children usually generated pairs of fractions with equal denominators. When the specified operation was multiplication or division, they usually generated operand pairs with a whole number and a fraction. Similarly, on the choose-operation task, when presented two fractions with equal denominators, children chose addition or subtraction more often than multiplication or division; when presented a whole number and a fraction, they chose multiplication or division more often than addition or subtraction. Children even learned the particular fractions (e.g., 3/4, 7/8, or 2/3) that were most likely to appear. The frequency with which each fraction appeared in textbooks and the frequency with which children generated that fraction on the generate-operand problems correlated r = 0.78. Thus, children are exceptionally good at learning mathematically irrelevant characteristics of instructional input, such as relations between operations and operands and frequencies of particular fractions. Unfortunately, they are much less apt at learning desired procedures and concepts.

FARRA 证明，使用标准正确的分数算术程序、这些程序的过度概括版本、随机策略选择机制和强化学习机制将教科书上的分数算术问题呈现给计算机模拟可以产生与儿童表现非常相似的表现。向 FARRA 呈现更大比例的未被充分代表的问题可以提高模型的性能。类似地，向随机选择的儿童展示更多很少出现的问题，可以帮助他们理解其他数学概念。平衡教科书问题的分布比解决数学成绩不佳的其他来源要简单得多，例如社会经济不平等、种族主义、美国家庭之间的数学学习价值观不一致，美国教师的数学知识不一致。因此，在数学教科书中呈现更均衡的问题分布是提高儿童数学学习的有希望的方法。FARRA demonstrates that presenting fraction arithmetic problems from textbooks to a computer simulation with standard correct fraction arithmetic procedures, overgeneralized versions of those procedures, stochastic strategy choice mechanisms, and reinforcement learning mechanisms produces performance that closely resembles children's performance. Presenting FARRA a greater proportion of underrepresented problems improves the model's performance. Similarly, presenting greater numbers of rarely presented problems to randomly selected children produces gains in their understanding of other mathematical concepts. Balancing the distribution of textbook problems would be far simpler than addressing other sources of poor math achievement, such as socioeconomic inequality, racism, inconsistent values among US families for math learning, and inconsistent knowledge of mathematics among US teachers. Thus, presenting more balanced distributions of problems in mathematics textbooks is a promising way to improve children's mathematics learning.

* Explain how this relationship between textbook input and child output is reflected in children’s performance on fraction problems requiring a measurement interpretation.

相关证据和因果证据都表明，教科书问题的输入与学习分数的测量解释有关——分数是可以在数轴上放置和排序的量值的解释。

在输入方面，教科书强调分数的部分-整体解释远远超过测量解释（[卡迪等人。2015](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[Charalambous 等人。2010](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[汉森等人。2019](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)）。

在输出方面，孩子们在可以通过部分-整体解释解决的分数问题（例如，可以计算对应于分子和分母的单位的问题）上比需要测量解释的问题（例如，在仅标记端点的数轴上进行估计）正确率高得多得多。（[Charalambous & Pitta-Pantazi 2007](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[汉努拉 2003](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[Tunç-Pekkan 2015](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)）。On the output side, children are far more accurate on fraction problems that can be solved via the part–whole interpretation (e.g., problems on which units corresponding to the numerator and denominator can be counted) than on problems that require a measurement interpretation (e.g., estimation on a number line with only the endpoints marked)

这些发现是相关的，但将儿童随机分配到各种条件的干预结果表明，因果关系也存在。强调测量解释的干预措施比强调部分-整体解释的条件（例如，[布雷思韦特和西格勒 2020](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[福克斯等人。2013](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[冈德森等人。2019](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[哈姆丹和冈德森 2017](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544),[莫斯与凯斯 1999](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)）。例如，[巴比里等人。(2020)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)发现相对于强调分数的部分 - 整体解释的教学，强调测量解释的教学导致有风险学生的数线估计和幅度比较的更大改进。典型的学生也出现了类似的发现（[萨克斯等人。2013](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)）。

Both correlational and causal evidence indicate that textbook problem input is related to learning of the measurement interpretation of fractions—the interpretation that fractions are measures of magnitude that can be placed and ordered on number lines. On the input side, textbooks emphasize the part–whole interpretation of fractions far more than the measurement interpretation ([Cady et al. 2015](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Charalambous et al. 2010](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Hansen et al. 2019](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)). On the output side, children are far more accurate on fraction problems that can be solved via the part–whole interpretation (e.g., problems on which units corresponding to the numerator and denominator can be counted) than on problems that require a measurement interpretation (e.g., estimation on a number line with only the endpoints marked) ([Charalambous & Pitta-Pantazi 2007](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Hannula 2003](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Tunç-Pekkan 2015](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)).

These findings are correlational, but the results of interventions in which children were randomly assigned to conditions suggest that causal relations are also present. Interventions that emphasized the measurement interpretation have yielded greater improvement in children's fraction knowledge than conditions that emphasized the part–whole interpretation (e.g., [Braithwaite & Siegler 2020](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Fuchs et al. 2013](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Gunderson et al. 2019](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Hamdan & Gunderson 2017](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544), [Moss & Case 1999](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)). For example, [Barbieri et al. (2020)](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544) found that relative to instruction emphasizing the part–whole interpretation of fractions, instruction emphasizing the measurement interpretation led to greater improvement in number line estimation and magnitude comparison among at-risk students. Similar findings have emerged with typical students ([Saxe et al. 2013](https://www.annualreviews.org/doi/full/10.1146/annurev-devpsych-041620-031544)).

【4. **Sociocultural Theories**】

1. **What is the “internalization of socially-shared processes”? What is the difference between the intermental and the intramental levels of learning? Why are both necessary within Vygotsky’s theory? How does learning to tie one’s shoes illustrate both levels of learning?**

* What is the “internalization of socially-shared processes”? What is the difference between the intermental and the intramental levels of learning?

维果茨基提出了一种内在社会性的发展变化机制。具体而言，他认为发展变化是通过社会共享过程的内部化而发生的。他认为，在发展过程中，每种心理功能都会发生两次，第一次是在“中间层”水平上（参与社会互动）和后来的“内在”层面（个人内部）。儿童最初在社会伙伴的支持下完成认知任务，随着时间的推移，这些社会互动逐渐内化，直到儿童能够自己完成任务。因此，个体心理过程起源于社会互动，并衍生于社会互动。从这个角度来看，社会互动不仅仅是影响发展道路的外部力量；它本身就是发展的因果机制。

Vygotsky proposed a mechanism for developmental change that is inherently social.

Specifically, he argued that developmental change occurs via the *internalization of socially*

*shared processes.* He argued that in the course of development, every psychological func

tion occurs twice—first at the “intermental” level (between people who are involved in social interaction) and later at the “intramental” level (within the individual). Children

initially perform cognitive tasks with support from social partners, and over time, these

social interactions are gradually internalized, until children can perform the tasks on

their own. Thus, individual psychological processes originate in and derive from social

interactions. From this perspective, social interaction is not merely an outside force that

influences the path of development; it is a causal mechanism for development itself.

* Why are both necessary within Vygotsky’s theory? How does learning to tie one’s shoes illustrate both levels of learning?

Vygotsky（1978）用来说明内化过程的一个例子是婴儿期指点的发展。根据他的描述，指点的发展始于婴儿试图到达所需目标的失败。当一个成年人将婴儿的动作理解为试图引起对物体的注意时，婴儿的动作的意义就发生了根本性的变化，从获得物体的工具性尝试到与成年人交流的尝试。然而，这种意义最初只存在于婴儿和成人之间的社会互动中，而不存在于婴儿的头脑中。最终，婴儿将触碰动作与社会情境联系起来，并开始理解动作的目的，不是针对一个物体，而是针对另一个人。当行动的社会意义被婴儿内在化时，行动就发生了根本性的改变，成为一种“真正的姿态”（Vygotsky，1978年，第56页）。因此，指向动作的意义首先是在成人和婴儿之间的互动中被社会建构的（中介层），然后逐渐被婴儿内化（内在层）。­

One example that Vygotsky (1978) used to illustrate the process of internalization is

the development of pointing during infancy. According to his account, the development of

pointing begins with an infant’s unsuccessful attempt to reach a desired object. When an

adult construes the infant’s actions as an attempt to draw attention to the object, the mean

ing of the infant’s action is fundamentally changed, from an instrumental attempt to obtain

the object to an attempt to communicate with the adult. However, this meaning initially

exists only in the social interaction between the infant and the adult, not in the infant’s

mind. Eventually, the infant links the reaching action to the social situation and begins to

understand the movement as aimed, not at an object, but at another person. When the social

meaning of the action is internalized by the infant, the action is fundamentally changed,

becoming a “true gesture” (Vygotsky, 1978, p. 56). Thus, the meaning of the pointing action

is first socially constructed in interaction between the adult and the infant (the intermental

level) and then gradually internalized by the infant (the intramental level).

作为内化的第二个例子，考虑一个孩子正在学习系鞋带。首先，一个成年人帮助孩子，口头指导孩子下一步做什么（“现在做一个圈，把另一条带子绕起来……”）。随着时间的推移，孩子会将步骤的顺序内化，这样她就可以在没有成人帮助的情况下控制自己的行动。她可能会在“心灵的耳朵”里“听到”大人的指示，但她不再需要大人为她的表演提供外部支持。

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As a second example of internalization, consider a child learning to tie her shoes.

At first, an adult assists the child, providing verbal guidance to the child about what

to do next (“Now make a loop, and bring the other lace around it . . .”). With time, the

child internalizes the sequence of steps, so that she can control her own actions with

out adult assistance. She may “hear” the adult’s instructions in her “mind’s ear,” but

she no longer needs the adult to provide external support for her performance.

请注意，这个框架强调了认知责任从技能较高的个体转移到技能较低的个体。为了描述这一过程，维果茨基引入了近端发育区的概念。近端发育区被定义为儿童能够独立完成的动作与儿童在与成人或更高级同龄人互动时能够完成的动作之间的距离（Vygotsky，1978，见图4.1）。这个概念是基于这样一种观察，即当孩子们得到帮助时，他们通常可以用更复杂的方式进行推理，或者表现出比他们自己更复杂的行为。例如，在本章开头的小插曲中，学龄前儿童能够在母亲的帮助下完成一个复杂的谜题，但如果他自己动手的话，他可能无法完成。同样，一个中学生在老师的指导下可能能够解出一个复杂的、多运算的代数方程，但她在独自工作时可能只能解出简单得多的方程。用老师的

Note that this framework emphasizes the transfer of responsibility for cognition

from more skilled individuals to less skilled ones. To characterize this process, Vygotsky

introduced the concept of the *zone of proximal development.* The zone of proximal develop

ment is defined as the distance between what a child can do independently and what the

child can do in interaction with an adult or a more advanced peer (Vygotsky, 1978, see

Figure 4.1). This concept was based on the observation that children can often reason in

more complex ways or perform more complex behaviors when they receive assistance

than they can on their own. For example, the preschooler in the vignette at the outset

of this chapter was able to complete a complex puzzle with assistance from his mother,

but he probably would not have been able to complete it had he worked on his own.

Similarly, a middle school student might be able to solve a complex, multi-operation alge

bra equation with guidance from her teacher, but she might be able to solve only much

simpler equations when working alone. Solving the complex problem with the teacher’s

help would provide an opportunity for the student to internalize the solution procedure,

and internalizing the procedure would allow her to solve it on her own at a later time.

Vygotsky believed that, to accurately characterize a child’s knowledge at a given

point in time, it is essential to consider the child’s *potential* competence, as manifested

in the zone of proximal development, as well as the child’s actual competence in inde

pendent performance. The two children depicted in Figure 4.1 display comparable

levels of independent performance, but dramatically different levels of potential com

petence. Thus, an accurate characterization of each child’s knowledge requires assess

ments of both levels. As discussed later in the chapter, Vygotsky’s views have had an

important impact on knowledge assessment in educational settings.

另一个重要的维果茨基原则是思维通过“内心”功能发展到“内心”功能的概念。也就是说，思考首先发生在社会层面（参与共同社会文化活动的人之间），然后是个人层面（即在儿童内部）。Hedegaard (2001) 解释说：

在维果茨基的理论中，学习是人与人之间发生的社会过程。他将学习概念化为以交流为中心的社会互动的内在化。学习发生在特定环境中的社交互动中，该环境由一个人内化。维果茨基的内在化并不是指复制，而是**将外部互动转变为**指导孩子行动的新互动形式。内在化并不直接反映外部社会关系；它是一种转化的反射（Hedegaard，2001：16-17；我们的重点）。

Another important Vygotskian principle is the notion that thinking progresses through 'intermental' functioning to 'intramental' functioning. That is, thinking occurs first on the social plane (between people engaged in joint sociocultural activity), and later on the individual plane (that is, within the child). Hedegaard (2001) explains:

In Vygotsky's theory, learning is a social process that takes place between people. He conceptualized learning as internalisation of social interactions in which communication is central. Learning takes place in social interaction in a specific context which comes internalised by a person. By internalisation, Vygotsky did not mean copying but**transforming the external interaction to a new form of interaction**that guides the child's actions. Internalisation does not directly mirror the external social relations; it is a transformed reflection (Hedegaard, 2001:16-17; our emphasis).

1. **What is inter-subjectivity, how does it develop, and why is it such an important concept within sociocultural theories?**

**intersubjectivity, which is the shared understanding between people that emerges through processes of mutual attention**

**and communication. this process starts from birth via imitation and mirroring processes that are important foundations**

**of sociality providing a basic sense of social connectedness and mutual acknowledgement with others. From the second**

**month, mirroring, imitative and other contagious responses are by-passed. To have intentions and mental states like**

**their own.** 主体间性，是⼈们通过相互关注和交流的过程⽽形成的共同理解。这个过程从出⽣开始，通过模仿和镜像

过程开始，这些过程是社会性的重要基础，提供了基本的社会联系感和与他⼈的相互承认。从第⼆个⽉开始，镜像、

模仿和其他传染性反应被绕过。拥有和⾃⼰⼀样的意图和⼼理状态。

Social and Cultural Learning Require Particular

Cognitive Abilities

### 社会和文化学习需要特殊的认知能力

现代社会文化理论的一个主要焦点是明确社会和文化学习的机制。解决这个问题的一种方法是，描述学习者和教师学习社会和文化所需的认知能力。

也许社会和文化学习所需的最基本的认知能力是建立主体间性的能力，这是通过相互关注和交流过程而形成的人们之间的共同理解。毫不奇怪，涉及高度主体间性的社会互动比以较少主体间性为特征的互动导致更大的学习（例如，Tudge，1992）。­

主体间性的能力很早就出现了。从婴儿大约2个月大时开始，他们和他们的照顾者开始表现出偶然的相互作用、互惠行动和反应，类似于相互给予和接受的谈话（例如，Bateson，1979；Trevarthen，1979）。到大约9个月时，婴儿可以很容易地跟随成年人的注视和指点手势（例如，Butterworth，2001；Morissette，Ricard，&Gouin Decarie，1995；Murphy&Messer，1977）。通过这些行为，婴儿有助于建立共同的注意力，在这种状态下，他们和他们的照顾者共同关注特定的物体或事件，并且是主体间性的关键组成部分。随着儿童越来越能够接受其他人的观点，他们在童年早期继续发展实现和保持主体间性的能力（例如，göncü，1993年）。­

通过对人类儿童和非人类灵长类动物的比较研究，我们进一步了解了从社会互动中学习所需的认知能力。与人类一样，许多其他灵长类物种的成员可以通过观察其他个体的行为来学习（Custance、Whiten和Fredman，1999；Hirata和Morimura，2000）。然而，根据迈克尔·托马塞洛及其合作者的说法，只有人类才能进行某些更高级的社会和文化学习，这些学习需要理解他人大脑的复杂性（赫尔曼，­­赫尔南德斯·洛雷达（Hernandez Lloreda）、哈雷（Hare）和托马塞洛（Tomasello），2007年；托马塞洛，1998年、1999年；Tomasello、Carpenter、Call、Behne和Moll，2005年）。根据这一观点，从社会互动中学习的关键是人类理解他人的能力，因为他们与自己相似，特别是有着与自己相似的意图和精神状态。托马塞洛及其合作者已经确定了三种依赖于这种理解的文化学习形式：模仿学习、指导学习和协作学习（托马塞罗等人，1993年）。我们在这里简要地讨论了这些学习形式，并在第9章中更详细地讨论了它们，该章重点讨论了社会认知的发展。­­­

模拟学习，根据托马塞洛的定义，学习是指为了达到相同的目标而复制另一个人的行为。因此，模仿学习涉及理解他人行为与目标之间的关系。这种学习形式可以与模拟学习区别开来，模拟学习涉及关注他人行为的最终结果，而不认识具体行为与预期目标之间的关系。因此，仿真包括学习有关任务的知识，而模拟学习包括学习一个人在任务中的行为（Nagell、Olguin和Tomasello，1993）。­

指导性学习是指学习者试图从教师的角度理解任务或材料，直接、有意地将信息从一个人传递到另一个人。在指导学习中，学习者将老师的指导内化，然后利用它们来调节自己的行为。指导学习既可以在正式环境中进行（例如，在学校上课），也可以在非正式环境中（例如，父亲教女儿如何钓鱼）。所有文化中的成年人都会定期指导他们的孩子（Csibra&Gergely，2011；Hewlett&Roulette，2016）。一些研究人员认为，人类交流系统特别适合于个人之间的知识传播，婴儿在进化过程中已做好接受此类指导的准备（Calero、Zylberberg、Ais、Semelman和Sigman，2015；Csibra和Gergely，2009；Kiraly、Csibras和Gergelly，2013）。通过教学进行教学的倾向和学习的能力都要求至少有一定的能力来理解其他人的心理状态。­­­­

第三种类型的文化学习，即协作学习，也需要这种能力。协作学习是指当多个人参与合作、目标导向的问题解决时发生的学习。作为这种学习的一个例子，考虑两个孩子一起为玩具火车搭建轨道。孩子们一起学习的轨迹可能比两个孩子各自独立学习的轨迹更复杂，而且每个孩子都可能在一起学习的过程中学到一些东西。虽然模仿和指导学习涉及一个从一个人到另一个人的传播过程，但协作学习涉及新知识的联合构建过程。这个过程包括建立一个共同目标，分担目标导向行动的责任，并合作执行这些行动——所有这些活动都需要能够从互动中的其他参与者的角度出发.

A major focus of modern sociocultural theories has been to specify the mechanisms

involved in social and cultural learning. One approach to this issue is to delineate the

cognitive abilities required for social and cultural learning, both on the part of learners

and on the part of teachers.

Perhaps the most basic cognitive ability needed for social and cultural learning

is the ability to establish *intersubjectivity,* which is the shared understanding between

people that emerges through processes of mutual attention and communication.

Not surprisingly, social interactions that involve a high degree of intersubjectiv

ity lead to greater learning than interactions characterized by less intersubjectivity

(e.g., Tudge, 1992).

The capacity for intersubjectivity emerges at an early age. Starting when

infants are about 2 months old, they and their caregivers begin to display *contingent*

*interaction*—reciprocal actions and reactions that resemble the mutual give-and-take

of conversation (e.g., Bateson, 1979; Trevarthen, 1979). By about 9 months, infants

can readily follow adults’ gaze and pointing gestures (e.g., Butterworth, 2001;

Morissette, Ricard, & Gouin-Decarie, 1995; Murphy & Messer, 1977). Through these

behaviors, infants contribute to establishing *joint attention,* a state in which they and

their caregivers share a common focus on particular objects or events, and a key

component of intersubjectivity. Children’s ability to achieve and maintain intersub

jectivity continues to develop through the early childhood years, as they become

increasingly able to take the perspectives of other people (e.g., Göncü, 1993).

Further insights into the cognitive abilities required for learning from social inter

action have been gained from comparative studies of human children and non-human

primates. Like humans, members of many other primate species can learn simply by

observing the actions of other individuals (Custance, Whiten, & Fredman, 1999; Hirata

& Morimura, 2000). However, according to Michael Tomasello and his collabora

tors, only humans are capable of certain, more advanced forms of social and cultural

learning that require understanding the complexities of others’ minds (Herrmann,

Call, Hernandez-Lloreda, Hare, & Tomasello, 2007; Tomasello, 1998, 1999; Tomasello,

Carpenter, Call, Behne, & Moll, 2005). According to this view, what is crucial in learn

ing from social interaction is humans’ ability to understand other people as being like

themselves, and in particular, as having intentions and mental states like their own.

Tomasello and his collaborators have identified three forms of cultural learning that rely

on this understanding: imitative learning, instructed learning, and collaborative learn

ing (Tomasello et al., 1993). We discuss these forms of learning briefly here, and we con

sider them in greater detail in Chapter 9, which focuses on the development of social

cognition.

*Imitative learning,* according to Tomasello’s definition, is learning that involves

reproducing another individual’s behavior *in order to achieve the same goal.* Thus, imi

tative learning involves understanding the relation between the other individual’s

behavior and his or her goal. This form of learning can be distinguished from *emula*

*tion,* which is learning that involves focusing on the end result of the other individu

al’s behavior, without recognizing the relation between the specific behavior and the

intended goal. Thus, emulation involves learning something about the task, whereas

imitative learning involves learning about a person’s behavior in the task (Nagell,

Olguin, & Tomasello, 1993).

*Instructed learning* is learning that involves direct, intentional transmission of infor

mation from one individual to another, with the learner attempting to understand the

task or material from the teacher’s point of view. In instructed learning, learners inter

nalize their teachers’ instructions and later use them to regulate their own behavior.

Instructed learning takes place both in formal settings (e.g., in lessons at school) and in

informal settings (e.g., a father teaching his daughter how to cast a fishing line). Human

adults in all cultures regularly instruct their children (Csibra & Gergely, 2011; Hewlett

& Roulette, 2016). Some researchers have argued that the human communication sys

tem is specifically adapted to allow the transmission of knowledge between individu

als, and that infants are evolutionary prepared to receive such instruction (Calero,

Zylberberg, Ais, Semelman, & Sigman, 2015; Csibra & Gergely, 2009; Kiraly, Csibra,

& Gergely, 2013). Both the propensity to teach and the ability to learn via instruction

require at least some ability to understand other individuals’ states of mind.

This ability is also required for the third type of cultural learning, *collaborative*

*learning,* which is learning that occurs when multiple individuals engage in coopera

tive, goal-directed problem solving. As an example of such learning, consider two chil

dren working together to set up a track for a toy train. The track the children make

together is likely to be more complex than the one either child could make indepen

dently, and each child is likely to learn something in the course of working together.

Whereas imitative and instructed learning involve a process of transmission from one

individual to another, collaborative learning involves a process of joint construction

of the new knowledge. This process involves establishing a common goal, sharing

responsibility for goal-directed actions, and cooperatively carrying out those actions—

all activities that require an ability to take the perspective of the other participants in

the interaction.

1. **Before the incorporation of sociocultural views, the field frequently made assumptions about the universality of child development and several studies focused on the individual child. Which significant points about child-culture are these studies omitting?**

**舞台搭建：社会文化方法的出现**

20世纪末，教育心理学领域越来越多地融合了社会文化观点（关于可能的社会政治原因，见Matusov，2008）。对几本教科书的研究表明，社会文化方法包含在关于该领域指导理论的导论章节中，社会文化研究方法的研究成果被整合到整个文本的叙事结构中（例如，Ormrod，2008）。这一变化反映了教育心理学的主要关注点发生了转变，即基于对实验实验室中孤立学习者的研究，寻找共性，以考虑社区和社会关系在儿童在自然环境中的学习和发展中的作用（Göncü，1999年）。我们在下面讨论这些转变。

Late in the 20th century, the field of educational psychology showed increasing incorporation of sociocultural views (for possible sociopolitical causes, see Matusov, 2008). An examination of sev- eral textbooks reveals that sociocultural approaches are included in the introductory chapters on guiding theories of the field, and the research findings in sociocultural approaches are integrated into the fab- ric of narratives throughout the texts (e.g., Ormrod, 2008). This change reflected shifts in educational psychology's primary focus on a search for univer- sals based on the study of isolated learners in experi- mental laboratories to consideration of the role of community and social relationships in children's learning and development in natural contexts (Göncü, 1999). We discuss these shifts below.

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过去，发展和教育心理学的主流观点仅在对普遍性的探索不足以解释个体或群体差异时才考虑文化（参见Cole，1996；Laboratory of Comparative Human Cognition，1983；LeVine，1970；Rogoff，2003；Shweder，1990）。这种将文化作为掩护的做法，也就是说，为了掩盖对人类差异的理解不足，很少明确提及文化在儿童学习和发展中的作用。只有当研究结果不支持研究人员对某些变量（如年龄和性别）的预期时，才会诉诸文化特征，这些变量被认为遵循普遍的发展过程。儿童时期的特点是去文本化，没有对儿童学习和发展所处的情感、社会和文化背景进行综合讨论。

In the past, the mainstream perspective in devel- opmental and educational psychology considered culture only when the search for universals was inadequate for explaining individual or group varia- tion (cf. Cole, 1996; Laboratory of Comparative Human Cognition, 1983; LeVine, 1970; Rogoff, 2003; Shweder, 1990). This use of culture as cover, that is, to cover up a lack of understanding of human variation, rarely made explicit reference to culture as playing a role in children's learning and development. Recourse to cultural features occurred only when findings did not support researchers' expectations with regard to certain variables, such as age and sex, that are assumed to follow a universal developmental course. Childhood was characterized in a decontextualized manner without integrative discussions of the affective, social, and cultural con- texts in which children's learning and development take place.

正如我们在本章中所讨论的，当代研究支持这样一种说法，即儿童的学习是由文化的目标和活动指导的，而这些目标和活动在不同的文化中可能有很大的差异。因此，在不同的文化中，儿童的学习和发展既有相似之处，也有不相似之处。将文化目标和活动视为儿童学习和发展的框架，使我们能够认识到，年龄和性别等被视为普遍不变的儿童特征的变量是以发展能力和性别表示的文化结构。因此，从（社会）文化角度解决教育心理学问题，可以更全面、更准确地了解儿童的学习和发展。同时，它提供了与设计和审查儿童教育环境有关的见解，特别是在世界上日益普遍的多元文化背景下。

As we discuss in this chapter, contemporary research supports the claim that children's learning is guided by the goals and activities of culture, and such goals and activities may vary substantially from one culture to another. As such, children's learning and development contain both similarities and dis- similarities across different cultures. Consideration of cultural goals and activities as frames for chil- dren's learning and development enables us to rec- ognize that variables such as age and sex that are regarded as universally constant characteristics of childhood are cultural constructions as expressed in developmental capacity and gender. Thus, address- ing questions of educational psychology from a (socio)cultural perspective presents a fuller and more accurate picture of children's learning and development. At the same time, it provides insights relevant to designing and examining educational settings for children, especially in multicultural con- texts that are increasingly common in the world.

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《教育心理学杂志》反映了这一观点-选择学要求对研究参与者进行详细描述，并解释与他们相关的研究结果（e.g.，Harris，2003）。

除了关于儿童发展和学习的普遍性的假设外，以前的研究侧重于分析单独的独生子女。诚然，这类工作至少在特定条件下产生了关于认知表现的个体差异和年龄差异的大量知识。然而，这类研究也未能提供跨语境学习的实质性概括或迁移。此外，当研究中包括不同的样本时，研究结果往往揭示了不同人群的认知表现有着深刻的差异社会或文化背景不同的群体。由于没有将认知功能与社会文化背景联系起来的理论，这些差异导致了对那些不同于研究人员采用的最佳发展和学习标准的人的假设不足（综述见Rogoff，2003）。

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Reflecting this view, the Journal of Educational Psy- chology called for detailed description of study par- ticipants and the interpretation of research findings in relation to them (e.g., Harris, 2003).

In addition to assumptions regarding the univer- sality of child development and learning, previous research focused on the individual solitary child as the level of analysis. Admittedly, such work yielded a substantial body of knowledge about individual and age-related differences in cognitive perfor- mance, at least under particular conditions. How- ever, such research also failed to provide substantive generalization or transfer of learning across con- texts. Moreover, when diverse samples were included in research, findings often revealed pro- found differences in cognitive performance across groups that varied in social or cultural background.

Without a theory to connect cognitive functioning to the social and cultural context, these differences led to deficit hypotheses about those who differed from the standards of optimal development and learning adopted by the researchers (for a review, see Rogoff, 2003).

许多以个体为研究对象的研究的一个附带缺点是，对促进和支持认知发展和学习的经验或过程很少进行调查。这是令人惊讶的，因为研究个人表现的研究人员很少认可认知发展的成熟解释，假设其中涉及一些外生力量。然而，在更广泛地承认社会文化方法之前，对外部力量的检查往往侧重于认知表现的身体和物质条件，而不是社会或文化贡献。例如，皮亚杰及其研究概念发展的追随者注意到了表现的某些经验特征，例如不同形式的物质在保护开始时的变化，而没有注意到对这一发展的社会和文化贡献，尽管研究已经证明文化贡献在这一发展中很重要（例如，见Price Williams、Gordon和Ramirez，1969）。同样，许多基于信息处理和认知科学方法的研究都关注作为直接问题背景的一部分的外部影响，这在仔细的任务分析中很明显，但社会和文化贡献没有考虑在内。简言之，许多长期以来研究认知发展和学习的方法都侧重于儿童个体，而在这样做的过程中，往往忽视了现实生活中充斥着其他人、人工资源和符号的环境，包括支持发展和使用这些技能的沟通。

An ancillary shortcoming of much of the research focused on the individual was that there was little inquiry into the experiences or processes that promote and support cognitive development and learning. This is surprising because few researchers who study individual performance endorse a maturational explanation of cognitive development, assuming that some exogenous forces are involved. However, prior to more widespread recognition of sociocultural approaches, examina- tion of external forces tended to concentrate on physical and material conditions of a cognitive per- formance rather than on social or cultural contribu- tions. For example, Piaget and his followers who studied concept development have attended to cer- tain experiential features of performance, such as variations in the onset of conservation across differ- ent forms of matter, without paying attention to social and cultural contributions to this develop- ment, even though research has established that cul- tural contributions are important in this development (e.g., see Price-Wiliams, Gordon, &rRamirez, 1969). In like fashion, much of the research based on information processing and cog- nitive science approaches has been attentive to external influences that are part of the immediate problem context, as evident in careful task analysis, yet social and cultural contributions are not taken into account. In short, many of the long-established approaches to the study of cognitive development and learning focus on the individual child and, in doing so, have tended to ignore the real-life setings replete with other people and human-made resources and symbols, including communication, that support the development and use of these skills.

虽然个人层面的分析一直是认知发展和学习研究的主要内容，但这种方法的科学基础是开放的。关注个人与许多西方社会，特别是美国的传统文化信仰是一致的。正如凯森（1979年）所写，“像朝圣者、牛仔和电视上的侦探这样的孩子总是被视为一个独立的、孤立的个体，作为一个自足的、完整的个体在发展中前进”（第819页）。凯森认为，发展科学家可能已经采取了一种反映根深蒂固的文化观点的方法。

他还预测，这种立场，或他所称的个人主义教条，将抵制对认知发展和学习的另类、更基于社会的观点。与Kessen（1979）的观察结果一致，当主流研究考虑到儿童的关系时，它往往侧重于二元关系，这是西方世界组织儿童学习活动最常见的关系形式。例如，关于选择性注意发展的研究考察了儿童在二元接触中是否遵循成年人指定的指示。

Although the individual level of analysis has been the mainstay in research on cognitive development and learning, the scientific basis of this approach is open to inquiry. A focus on the individual is consis- tent with traditional cultural beliefs of many Western societies, especially the United States. As Kessen (1979) wrote, "The child-like the Pilgrim, the cow- boy, and the detective on television-is invariably seen as a free-standing isolable being who moves through development as a self-contained and com- plete individual" (p. 819). Kessen suggested that developmental scientists might have adopted an approach that reflected deeply held cultural views.

He also predicted that this position, or dogma of individualism, as he called it, would resist alterna- tive, more socially based views of cognitive develop- ment and learning.

Consistent with Kessen's (1979) observations, when the mainstream research has taken children's relationships into account, it has often focused on dyadic relationships that are the most common form of relationship by which children's learning activi- ties are organized in the Western world. For example, research on the development of selective attention examines whether children follow instruc- tions specified by an adult in a dyadic encounter.

然而，正如我们在本章第三节中所讨论的，这种社会安排在世界许多地方都不是规范；孩子们的活动通常是分组进行的，他们的注意力由许多人和多个事件同时监控（Cole，Meshcheryakov，&Ponomariov，2011；Gauvane，2001）。因此，受社会文化理论启发的研究有多种形式；一些集中于二人组，其他集中于三人组或更大的组。一些研究侧重于人际关系中的人（例如，家人、兄弟姐妹、同学），其他研究涉及陌生人（例如，随机分配的同龄人、讲师和学习者）。然而，所有这些研究都集中于社会背景下的认知功能。社会（文化）方法将儿童的学习和发展作为支持和指导这种学习的现有社会网络的一部分，以准确反映这一过程。

However, as we discuss in the third section of this chapter, this social arrangement is not the norm in many parts of the world; children's activities usually take place in groups, and their attention is moni- tored by a number of people and multiple events simultaneously (Cole, Meshcheryakov, & Ponomar- iov, 2011; Gauvain, 2001). Thus, studies inspired by sociocultural theory take myriad forms; some con- centrate on dyads, others on triads or larger groups.

Some studies focus on people in relationships (e.g., families, siblings, classmates), and others involve strangers (e.g., randomly assigned peers, instructors, and learners). Yet, all of these studies are united in their focus on cognitive functioning in a social con- text. Socio(cultural) approaches examine children's learning and development as part of their existing social networks that support and guide this learning in order to reflect this process accurately.

社会文化方法也支持儿童的关系和社会文化活动是分析的重要组成部分，即使重点是独生子女。这种观点的例子可以在幼儿的独处想象游戏中看到。当一个孩子在她的游戏中假装是母亲时，她正在练习一些她在非游戏文化生活中经历过的关于母亲身份的事情在她与其他人的关系中（参见Göncü&Gaskins，2011）。

Sociocultural approaches also espouse that chil- dren's relationships and social and cultural activities are an essential part of the analysis even when the focus is on the solo child. Examples of this perspec- tive are seen in young children's solitary imaginative play. When a child pretends to be a mother in her play, she is practicing something that she has experi- enced in nonplayful cultural life about motherhood in her relationships with other people (cf. Göncü &Gaskins, 2011).

最后，社会文化方法质疑实验研究的有效性，在实验研究中，为了建立因果关系，人们努力将外界对绩效的影响降至最低。通常，这意味着将孩子们从他们日常日常活动发生的自然环境中剥离出来。孩子们通常在单独的实验室环境中接受测试或面谈，或者在实验者或代理人的陪同下（例如，电脑显示器上的指示）。甚至在更为自然主义的环境中进行的研究，如课堂，也往往侧重于个人（例如，在私人空间或小组环境中进行自我测试的儿童，在课堂上观察从事独立工作的儿童）。正如许多人类发展学者所指出的，最著名的是Bronfenbrenner（1979），当孩子们被安置在实验实验室时，他们的行动过程是由实验室环境决定的，由此得出的结果反映了一个与孩子们日常生活不同的表面现实。社会文化方法提供了一些方法，可以扩展实验方法，并将其与微遗传学、人种学和比较方法相结合，以便准确描述儿童的学习和发展与其社会和文化生活的关系（Harris，2003）。在本章中，我们广泛借鉴实验研究，并将其与使用观察和人种学方法的研究相结合，以说明社会文化方法对我们领域的贡献。接下来我们将讨论社会文化理论，然后是研究和方法。

Finally, sociocultural approaches question the validity of experimental research in which efforts are taken to minimize external influences on perfor- mance in presumably confound-free experiments with the aim of establishing cause-effect relation- ships. Often, this means stripping children from their natural contexts in which their regular quotid- ian activities take place. Children are usually tested or interviewed in isolated laboratory settings, either alone or in the company of an experimenter or proxy (e.g., instructions presented on a computer monitor). Even studies conducted in more naturalis tic settings, such as the classroom, have tended to focus on the individual (e.g., children tested on thei own either in a private space or group setting, chil- dren observed in the classroom as they engage in independent work). As noted by many scholars of human development, most notably Bronfenbrenner (1979), when children are placed in an experimenta laboratory, their course of action is shaped by the lab setting, and the resultant findings reflect a super. ficial reality that is different from children's day-to- day living. The sociocultural approach offers ways in which experimental methods can be expanded as well as integrated with microgenetic, ethnographic, and comparative methods in order to accurately describe children's learning and development in relation to their social and cultural lives (Harris, 2003). In this chapter, we draw extensively from experimental research and use it in conjunction with research using observational and ethnographic methods in illustrating sociocultural approaches' contributions to our field. We turn next to the dis- cussion of sociocultural theories followed by research and methods.

【5. **Language Development**】

1. **In what ways do languages accommodate the abilities of toddlers?【Language Development】**

The only phonemes that can be produced when the lips are pressed to the breast are nasal sounds, such as m and n. Later, infants may

reproduce these sounds at the mere sight of food, to express an interest in eating, or to ask for some other change. Thus, words including

m and n are especially convenient for naming the person who most often provides food and fulfills desires, the mother.

The use of such easy-to-make sounds to name mothers is a particularly nice example of cultures adapting to children’s natures in ways gratifying to parent and child alike. Cultures also accommodate to the phonological limitations of slightly older children by not using difficult to-pronounce words for the objects toddlers most want to talk about (e.g., people, animals, and vehicles). For example, although str sequences are fairly common in English (e.g., “strong,” “strap,” “straight”), few are present in the names of objects that

particularly interest young children.

Although parents usually view their infants’ first word (or first sign) as a major

milestone, the infants’ achievement is quite continuous with the development of bab

bling before that point. For infants acquiring spoken languages, the sounds of infants’

babbling and of their first words tend to be similar. Summed across a set of 15 lan

guages, the sounds *b, p, m, d*, and *n* are the most common sounds in infants’ bab

bling (Locke, 1983). This tendency makes understandable why in extremely diverse

languages, words with these sounds, such as “papa,” “mama,” and “dada,” are names

for parents and are among the first words that children learn (Table 6.3). Babies are

making the sounds anyway; languages may as well take advantage of the fact.

As seen in Table 6.3, the consonants *m* and *n* are associated with meaning “mother”

but not “father.” This pattern is typical; an examination of more than 1,000 terms

drawn from the world’s languages showed that 55 percent of the terms for “mother”

included nasal sounds such as *m* and *n*, but only 15 percent of the terms for “father”

did (Jakobson, 1981). Jakobson proposed an intriguing explanation for the difference.

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1. **Which are most common: underextensions or overextensions? Describe the evidence on which your conclusion is reached. What are the implications of this finding for learning in general?【Language Development 】**

Overextensions are the most dramatic of these errors; almost everyone notices when a child calls a cat “doggie.”

Underextensions are less dramatic; in everyday situations, it is often impossible to know whether a child who does not say

“doggie” upon seeing a dog underextends the term or simply does not feel like talking about the dog. This created an initial

impression that overextensions were more common than underextensions.

However, more direct tests of toddlers’ word meanings (show

ing them objects and asking “What’s this?” or “Is this a \_\_\_\_\_\_\_\_?”) have revealed that

underextensions are actually more common (Kay & Anglin, 1982). Beginning language

learners tend to be conservative in extending newly acquired words to novel referents

(MacWhinney, 1989).

1. **What evidence is there for critical periods in language learning? Why is the evidence more dramatic for people whose native language is Chinese or Japanese than for people whose native language is Spanish or French?**

Lenneberg (1967) raised one in- triguing possibility: that the time between 18 months and puberty is a critical period, during which the

brain is especially receptive to learning grammar.

Age of arrival was closely related to ultimate level of grammatical mastery. In contrast, number of years in the United States had little

relation to it. The grammatical knowledge of immigrants who came before age 7 was comparable to that of native- born adults; the

knowledge of those who came between 8 and 10 was slightly weaker; and the knowledge of those who came between 11 and 15 was

weaker still. Most strik- ing, the knowledge of those who came after age 15 was quite poor (see Figure 6.4). Only one of the participants

who arrived after age 15 showed as much grammatical knowledge as the least knowledgeable participant who arrived before age 11.

Further, among those who arrived after age 15, neither age at arrival nor number of years in the United States correlated highly with

degree of mastery.

Because Chinese Korean Japanese and other languages are not Latin-based languages.

1. **What are “pidgins” and “creoles”? Take the Nicaraguan child sign language learner as an example of what the transition from “pidgins" to "creole" looks like.【Language Development 】**

【6. **Memory Development**】

1. Why is the way researchers pose their questions (in eyewitness testimony cases) so important? What has been found to be the most effective way to ask questions to younger children? Give your own example of an effective question.【**Memory Development**】
2. What are the differences among encoding, storage, and retrieval (info processing perspective)? Why are all necessary for memory to function?【**Memory Development**】

Encoding is defined as the initial learning of information; storage refers to maintaining information over time; retrieval is the

ability to access information when you need it.

How we encode information determines how it will be stored and what cues will be effective when we try to retrieve it. And

too, the act of retrieval itself also changes the way information is subsequently remembered, usually aiding later recall of the

retrieved information.

1. How does culture influence what children remember?【**Memory Development**】

There are cultural differences in physical environments, in views of the self, and in caregiver–child conversations about past events. All

these differences contribute to differences in the content and quality of children’s memories. People who live in different physical

environments have different memory needs. There is also variation across cultures in how people view the self. Culture also in6uences

the age of people’s earliest memories. On average, young adults from cultures that emphasize autonomy and independence tend to

have :rst memories that are earlier.

1. Why are young children more suggestible than older ones?【**Memory Development**】

children's memory traces alter more easily. The frequency with which questions are asked may also influence children’s

memory performance. Young children may also change their answers when a question is repeated, to please the interviewer.

1. What aspects of memories formed in very early childhood make the study of childhood amnesia difficult?【**Memory Development**】

【7. **Conceptual Development** 】

1. How does imaginary play contribute to theory of mind development? What correlations have been found relating to such?【**Conceptual Development**】
2. What sorts of interactions do adults have that can be compared to the imaginary

companions of children? Are these comparable to imaginary companions? (page 239)【**Conceptual Development**】

1. What basic memory abilities are present even in infancy, and what do they allow infants to do?【**Memory Development**】
2. Why do you think researchers sometimes look at conceptual development in general, and other times at the development of particular concepts?【**Conceptual Development**】
3. What are the implications of whether children understand counting principles before or after they become able to count?【**Conceptual Development** 】
4. What are goal sketches? In what instances do children seem to employ them and what does this imply? How will improving children’s conceptual understanding of fractions help them create goal sketches for fraction arithmetic? Provide an example of how this would work.【**Conceptual Development** 】