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Synthesis

How important is it?

Social cognition refers to the awareness of one's own and other people's mental states (i.e., acquiring a theory of mind), including emotions, motives, desires and feelings. Socio-cognitive skills, such as the ability to understand, describe and predict people's mental states, allow children to develop a strong social cognition. Developing social and cognitive awareness is especially important during infancy to prepare children to interact properly with the social world prior to school entry. For example, it is through group activities that children gradually learn the importance of sharing. This crucial ability originates from children's understanding that other children may have a desire to play with the same toys.

Along the same line, recent evidence indicates that children's socio-cognitive skills may have a direct impact on the quality of their relationships and school success. Children with a more developed social cognition tend to be better communicators, socially competent, popular with peers, happier at school, and academically more advanced. In contrast, those with poor social cognition are more likely to have difficulty making the transition to school, to react more violently in face of harsh parenting, and to experience difficulties in school that may be misread as conduct problems (e.g., lacking respect towards a teacher).

Lastly, it is important to foster early children's socio-cognitive skills because they have a bigger impact on children's social and academic development when acquired at a young age.

What do we know?

Recent evidence indicates that social cognition begins early in life, even before language acquirement. Prior to age one, infants are able to follow the attention of others, to participate in simple turn-taking games (e.g., pick-a-boo), and to have an understanding of goal-directed behaviours, such as grasping or reaching for an object. Then, around the age of two, children become increasingly aware that others experience mental states that are different from their own. For example, they recognize that somebody else may like something they do not like. As preschoolers develop language abilities, they become able to understand the perspective of others which leads to changes in social behaviour including an increase in empathic and

prosocial behaviours. Although the transition from intuitive to reflexive social understanding develops progressively, differences in social cognition depend both on child and family factors.

Children with strong social cognition tend to have stronger language abilities, emotion regulation and executive function skills (e.g., planning skills, self-control, and cognitive flexibility). By controlling their behaviours and emotions, they are better able to take another's perspective and to get along with others. Furthermore, family factors, including a positive parenting style and siblings relationships, contribute to children's social and cognitive understanding. Specifically, children tend to develop early socio-cognitive skills when secure attachment and guidance are provided by parental figures. Lastly, interactions between siblings, either positive or negative, have an additional impact on children's cognitive outcomes. For example, siblings provide the child an opportunity to engage in pretend play, in family conversations, provocation and teasing. In fact, even disputes foster social cognition through reconciliation of different points of view.

What can be done?

Children's social cognition can be enhanced by several activities performed within the family. Given that children's ability to inhibit their impulsive thoughts/ behaviours (i.e., executive functions) tends to act as an important predictor of social cognition, parents should provide an adequate balance of guidance and autonomy when playing with their children. Activities that involve talking about people's thoughts, desires, and feelings, and the reasons why they act the way they do should be privileged. For instance, engaging children in joint pretend play is one way for them to recognize that the expression of emotions and behaviours varies from one person to the next. Another highly recommended activity is story reading. While questioning children on various events occurring in stories, especially those involving tricks, secrets or mistakes, parents help children to adopt the perspective of others (e.g., asking children whether they believe the Red Riding Hood knows that the wolf is dressed as her grandma). Furthermore, providing reasons when correcting children's misbehaviours is highly recommended because it helps children to develop an early awareness that people experience different feelings or desires. Lastly, a sensitive and caring parenting style is especially beneficial when interacting with children in various activities (e.g., peek-a-boo, pretend-play, picture-books). Through positive dyadic exchanges, children have the opportunity to improve their social and emotional learning which in turn sets the stage for positive interactions within the peer groups. Indeed, these social behaviours not only promote social cognition but also teach children how to positively interact

with their peers while reducing the likelihood that their social and cognitive understanding will lead to antisocial behaviours (e.g., teasing, bullying, and lying).

Social Cognition in Infancy

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December 2019, Éd. rév.

Introduction

Social cognition refers to the understanding of how people, including both others and the self, behave. In general, humans make sense of their own and other people's behaviour by making reference to internal psychological states, states such as emotions, thoughts and desires. Older children and adults can clearly show this understanding by the use of language referring to the psychological states and activities of themselves and others. However, even before the onset of language, infants may reveal this understanding through their behaviour towards others. Infants find other people fascinating from very early in life and, even before they can talk, are able to interact and communicate with them. Such interest and interaction depends on early forms of social cognition.

Subject

Infants are born into a complex social world. Infants need to learn quickly how to engage with the social world: how to respond to the actions of others, how to direct others towards fulfilling their needs, and how to build relationships. Furthermore, because most of what children will learn is culturally conveyed, infants rapidly need to use other people to learn about the external world.

Problem

In the first 18 to 24 months, infants are not yet able to use language to interact with others or to express their understanding. Therefore, the significant problem in gaining knowledge about the development of infant social cognition is how to explore what infants understand about themselves and others without relying on language.

Research Context

Research has focused on how infants respond to various forms of social stimulation at different stages of development. By carefully controlling and monitoring the form of social stimulation that is presented to infants at different ages, and then observing their responses, much can be learned about how infants understand the social world.

Key Research Questions

Perhaps the core question of interest to researchers of infant cognition is: How do infants gain an understanding of persons as embodied psychological agents with both "first-person" experience and "third-person" characteristics?[1] There are two sides to this understanding. First, it involves knowing that other people are similar in nature to the self in that they have subjective experiences and second, it involves coming to an awareness that the self has an objective body like others. Subsidiary to this overarching question are questions about the nature of development. For example, are there fundamental, core social concepts such as intentionality, that govern the way infants understand other people from very early in infancy,[2] or are concepts about the nature of persons acquired in a more gradual piecemeal fashion based on "second-person" information gained though interactions with other people through the period of infancy.[3,4]

Recent Research Results

It is well known that infants begin life with an interest in, and preference for, social stimulation.[5] Human faces and voices are the most effective ways to capture a young infant's attention. By two to three months, infants are able to participate in simple social interaction with others whereby they can coordinate their gestures, vocalizations and facial expressions with others.[6] At this time infants begin to interact with objects in their environment selectively, this experience facilitates their prediction of other's action.[7] During the second half of the first year, infants start to engage in joint or shared activities with objects such as toys.[6] They can participate in simple turn-taking games; they can follow the attention of others as well as direct the attention of others; they can acquire emotional orientations to objects based on the emotions that others express; they form social evaluations based on the actions of others;[8] they can learn new ways of engaging with objects though imitation of other. These kinds of behaviours indicate that infants are becoming sensitive to the psychological states of others, although at first this understanding is manifest only in situations in which infants can share such psychological states with others.[9] During the second year, infants become able to recognize that others may experience psychological states

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that are different from their own and form expectations of how others will behave on this basis, for example, they can understand that someone else may not see something that they can see or that someone else may feel something that they do not feel. At the same time, infants show clear evidence of self-awareness, such as recognizing themselves in a mirror.[10] These developments result in profound changes in infants' social behaviour. Most notably they begin to show empathic and prosocial behaviour towards others,[11] and they become able to cooperate with,[12] and learn more effectively from others.[13] These behaviours are increasingly guided by social understanding that extends beyond action cues, as infants select appropriate prosocial responses based on a partner's goal and imitate the intended actions of others.[14,15] At the same time, infants become increasingly autonomous, able and willing to express and exert their independence.[1] These various findings reveal progressive development in social cognition in the infancy period even before language has become established.

Research Gaps

Although much is now known about the milestones of infants' understanding of others and their awareness of self, we still know relatively little about how development proceeds from one milestone to the next. Why do infants begin to be capable of structured social interaction at about two to three months? Why are they able to engage in object-centered joint activity at about nine months? And what paces the onset of the awareness of self and the awareness that others may have different psychological states at about 18 to 24 months? There is good reason to believe that reliably patterned social stimulation plays a significant role in these developments. However, other more maturationally governed changes such as changes in brain organization and cognitive complexity seem also to be important.

Implications for Parents, Services and Policy

Almost from birth, infants are very sensitive to the behaviour of other people and from very early in life they crave social attention. As they develop, the type and complexity of the social attention they seek changes so that initially face-to-face attention may suffice but by the end of the first year infants want to play with objects with other people and engage in various joint activities with others. At this point they are able to learn new behaviours through imitation of others and the sophistication of this learning rapidly expands during the second year of life. Infants are thereby launched upon what will become a lifelong career of cooperative activity and social learning. The development of social cognition during the infancy period is dependent upon

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regular and reliable social interaction that is keyed to the infant's developmental stage. Faced with expanding attention demands on parents in the form of digital media, it remains essential that social development through the first two years is supported by consistent joint activities (i.e., playing games) with responsive caregivers.

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Infants' Social Cognitive Knowledge

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Introduction

Social cognition refers to thoughts and beliefs that individuals and groups hold concerning how and why people act as they do. The ability to interpret one's own and other people's actions in terms of internal and mental states that motivate human behaviour is central to social cognition. Much past work has demonstrated that there are significant developments in children's ability during the preschool period to use psychological states to predict, describe and explain behaviour.[1,2,3] This chapter reviews recent evidence that suggests the basic foundations of these abilities can be traced back to infancy.

Subject

By the end of the first two years of life, infants are adept at understanding basic goals, intentions, perceptions and emotional expressions, as well as simple preferences and dispositions. These socio-cognitive abilities are the building blocks for more mature aspects of social cognition, such as theory-of-mind (see Astington[4] and Miller[5] chapters). Moreover, early socio-cognitive capacities contribute to learning across a range of domains, such as language learning,[6,7] imitative learning,[8] causal learning,[9] and representational understanding.[10]

Problems

Because infants cannot undertake language-based tasks, researchers must rely on novel and innovative non-verbal methods to tap early social cognition. These methods, which typically capitalize on infants' social behaviour (either occurring in a natural or an experimental context), [11,12] and infants' visual responses to simple social events,[13] have yielded a wealth of information regarding early social cognition. However, as the findings from these methods are often open to multiple interpretations,[14] converging methods are needed to gain an accurate picture of social cognition in infancy.

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Research Context

Infants' early social cognitive understanding is inferred via their spontaneous or elicited social behaviour in naturalistic and laboratory settings, and via their visual and manual responses to simple social events presented in the context of experimental paradigms. Carefully controlled experiments, with a range of different manipulations are necessary to reduce the number of potential alternate interpretations of research findings.

Key Research Questions

1. What is the range of socio-cognitive understandings that infants possess? How are these understandings similar to, and different than, the understandings of older children and adults?
2. To what extent do infants possess a sophisticated mentalistic understanding of other people's actions (e.g., understand behaviour in terms of psychological states) versus a more simple behavioural understanding (e.g., understanding behaviour in terms of contingencies and rules)? How can we distinguish between these different levels of understanding?
3. Are certain aspects of social cognition innate? If so, which ones?
4. What factors or experiences drive developmental change in early social cognitive understanding?
5. Are early social cognitive abilities universal or culturally specific? To the extent that there is variability in social cognition across cultures, when and how do these differences arise?

Recent Research Results

Recent work suggests that there are advances over the first two years of life in infants' understanding of goals and intentions, their understanding of perceptions and emotions, and their understanding of preferences and dispositions.

One integral aspect of social cognition involves the ability to construe action as motivated by goals and intentions. By 6 months of age, infants view simple actions, such as reaching for and grasping an object as goal directed.[15] Over the course of the next 6 months they identify the goal of increasingly complex actions and action sequences.[16,17] By this age, infants can also differentiate between accidental and intentional actions,[13] and recognize that only animate agents (and not inanimate objects) possess goals and intentions.[15]

Another important aspect of social cognition involves recognizing the meaning of perceptual acts and emotional expressions. Starting at 9 to 12 months of age, infants appear to understand simple perceptual experiences and recognize the value of different emotional expressions. For example, infants recognize that an adult looking at a toy with her eyes open is having a perceptual experience, but an adult looking at a toy with her eyes closed is not.[18] Moreover, infants can use an experimenter or parent's emotional expression to decide whether or not to approach a novel toy,[19] or engage in a novel activity.[20]

The ability to know how personal characteristics influence behaviour is also a critical aspect of social cognition. Between 12 and 15 months infants begin to understand simple dispositions and preferences. For example, at this age infants expect an agent to continue to pursue a prior behaviour or activity when placed in a novel context.[21,22] Moreover, infants appreciate that preferences and dispositions are personal: they understand that different people can like different things.[23]

Research Gaps

One critical question for future research concerns the mechanisms, factors and experiences that underlie developments in early social cognition. Current work is beginning to demonstrate how specific experiences that infants have as actors and observers in the world serve as a catalyst for acquiring specific aspects of social cognitive knowledge.[24] For example, infants' ability to perform specific goal-directed acts (e.g., using a reaching tool to obtain an out-of-reach toy), appears to contribute strongly to their ability to understand the goal of these acts when produced by others.[25] A second question concerns how innate sensitivities that infants possess may interact with environmental experience to produce development. Finally, ongoing research is investigating the neural processes underlying early social cognition. The answer to these questions will not only contribute to our understanding of what changes in early social cognition, but will also inform how developmental change occurs.

Conclusions

Whereas researchers once thought that social cognition was uniquely the province of older children, it is now evident that infants possess a range of social sensitivities and early social cognitive understandings that provide the foundation for later, more mature aspects of social cognition. Infants' social cognitive understanding appears to become increasingly abstract over

the first two years of life: they understand the visible goals to which action is directed, prior to understanding simple perceptual and emotional states that drive behaviour, before understanding how ongoing personal tendencies motivate actions. Recent work reveals that achieving each of these understandings is not an all-or-none phenomenon. Rather, development may proceed one action or social event at a time, in a piecemeal fashion.[26] This developmental picture raises the possibility that additional factors, such as language, are required to achieve the more explicit and integrated social cognitive understanding of people and their behaviour that older children possess.

Critically, however, infants' early social cognitive knowledge has consequences not only for their social interactions, but also for learning across domains. Infants use their knowledge of goals, intentions, perceptions, emotions, dispositions and preferences to engage in language learning,[6,7] imitative learning,[8] and understanding cause and effect.[9]

Implications for Parents, Services and Policy

Research suggests that developments in early social cognitive understanding are driven, at least in part, by opportunities to act on the world and watch others act. These findings suggest that live social interactions that feature a combination of action and observation on the part of infants are important for the development of early social cognitive skills, and, by extension, for learning more broadly. Recent work has also begun to explore the specific conditions that facilitate infants' and children's understanding of other people's behaviour. These studies have demonstrated that contexts in which adults act as collaborative partners to children,[27] accompany their behavior by verbal explanations,[28] and/or provide a preview of the goal of an activity prior to demonstrating the activity produce the best learning.[29]

Knowledge of early socio-cognitive milestones can also be helpful for diagnosis and remediation of developmental disorders that are marked by social deficits, such as autism.

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Social-Cognitive Development in Early Childhood

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Introduction

Social cognition has to do with thoughts and beliefs about the social world. The topic encompasses beliefs about others, the self, and people in general, as well as beliefs about specific aspects of people (e.g., thoughts, desires, emotions), and about social groups and social institutions. The development of various forms of social-cognitive understanding is one of the most important achievements of childhood cognitive development.

Subject

Social cognition has been a central topic in child psychology since the inception of the field.[1] As was true for many topics, the dominant approach through the mid 20th century was that of Piaget.[2] Piaget argued that young children's thinking is characterized by egocentrism, or difficulty in separating one's own perspective from that of others. Thus preschool children often assume that others think or feel or wish exactly what they do, a basic deficit in social-cognitive understanding. Subsequent research has demonstrated that Piaget somewhat underestimated young children's perspective-taking abilities.[3] Nevertheless, his work did identify a central challenge in any social-cognitive activity: separating one's own viewpoint from that of others. Indeed, in some situations even adults are prone to egocentric responses.[4,5]

Perspective taking is just one of several headings under which social cognition has been studied. Work on metacognition, for example, examines children's understanding of mental activities – what they know, for instance, about memory, attention or language.[6,7] Here and in general, even preschoolers show simple forms of understanding. Most developments in metacognitive understanding, however, are not evident until the grade-school years, and in many instances, development continues into adulthood.

In recent years most research on social cognition has been carried out under the heading of theory of mind.[8,9,10]

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Theory of mind is broader in scope than its predecessors, encompassing understanding of the full range of mental states, as well as the antecedents and consequences of such understanding. An additional difference is the focus on young children; theory of mind began as a preschool literature, and in recent years has been extended to toddlerhood and infancy as well. The result is both a fuller and a more positive picture of young children's abilities than had been the case with the first generation of research on social cognition.

Problems

As with many topics in child psychology, work in social cognition addresses three general issues. One is the descriptive question: What develops and when does it develop? Challenges here include devising optimal assessment methods for the developments in question and identifying interrelations among different forms of understanding.[11,12] A second question is why these developments occur. What are the causal forces that shape children's social-cognitive understanding? A final question concerns the effects of advances in social cognition. How, in particular, do children's social interactions change as their social-cognitive abilities mature?

Research Context

Although naturalistic data play some role,[13] most of what we know about social-cognitive development comes from a wide variety of ingenious experimental measures. One example – and by far the most often studied example – is the false belief task.[14] The false belief task tests a basic component in the understanding of belief: the realization that beliefs are mental representations and not direct reflections of reality, and as such may be false. Other tasks test other forms of epistemic understanding, for example, the ability to separate appearance from reality[15] or the knowledge of how evidence leads to belief.[16] Still other tasks are directed to other mental states, for example, the realization that different people may have different desires,[17] or understanding of the relation between desire satisfaction and subsequent emotion.[18] A research literature has also grown up devoted to developments beyond the preschool period—the capacity for recursive thinking, for example, and an enhanced appreciation of individual differences in people's mental states.[19]

Recent Research Results

In a general sense, research on theory of mind is reminiscent of the earlier Piagetian literature, in that it often surprises us with respect to what children do not yet know. Thus prior to age 4 most children find it difficult to understand that beliefs can be false, either the beliefs of others or their own beliefs.[11] They show a myriad of other misconceptions and confusions as well, including difficulty in separating appearance and reality[15] and problems in tracking the relation between experience and belief formation.[16] On the other hand – and in contrast to the Piagetian literature – the difficulties are not long-lasting, for many basic developments, including understanding of false belief, emerge by age 4 or 5. Indeed, some recent research, still controversial, suggests that the rudiments of false belief understanding may be present in infancy.[20,21] For so-called nonepistemic states, such as pretense or desire, basic forms of understanding emerge even earlier than for belief, in some instances by age. The result is a valuable corrective to the earlier literature on social cognition, which had characterized the preschool period primarily in negative terms. Finally, recent research has not only documented a wide range of early appearing social- cognitive achievements but also provided evidence of the effects of such developments, in that it demonstrates consistent relations between social-cognitive understanding and the quality of children's social interactions.[22]

Research Gaps

As is true in many areas of child psychology, we know more about what develops in social cognition than weknow about how it develops. All theories agree that both social experience and biological maturation must play a role; theories differ, however, in the relative role accorded to these factors, in exactly how they are posited to operate, and in the form that the underlying knowledge system is assumed to take.[10,23] Resolving these discrepancies remains a task for future research. Another challenge for future research is to expand the cultural scope of research on theory of mind. Research to date suggests both some basic similarities in development across the world's cultures and some intriguing differences stemming from different cultural emphases.[24,25]

Conclusions

The study of social cognition, one of the venerable topics in child psychology, has been reenergized by the work on theory of mind. This work has identified a wide range of social-cognitive achievements that emerge in the first 4 or 5 years of life. It has also provided preliminary answers to two questions that are the subject of ongoing research: What are the origins and what are the consequences of social-cognitive understanding?

Implications

Social cognition – especially as studied under the theory-of-mind heading – is primarily a normative topic, in that it concerns basic developments that virtually every child eventually masters. Exceptions occur in certain clinical syndromes, most notably autism; indeed, the theory-of-mind approach has been central to our understanding of the difficulties faced by people with autism.[26] In typical development, however, social cognition is not something that requires explicit adult tuition. Still, this does not mean that there is no role for parents or teachers. Various kinds of social experience can hasten the onset of social-cognitive abilities, including certain forms of parental child rearing.[27] Recent research also indicates that social-cognitive skills are at least somewhat trainable; approaches that emphasize the relevant mental state language may be especially beneficial.[27,28] Beyond simply speeding up development, adults can affect the content of children's social-cognitive beliefs. All children, for example, form self-conceptions or beliefs about the self, but some children's self-conception are more positive and development-enhancing than those of others.[29] Social-cognitive abilities can be used not only for positive purposes (e.g., empathy, communication) but also for negative ones such as teasing or bullying.[30,31] These, too, can be affected by parental practices. The clearest pragmatic implication of work on social cognition has long been evident: Experiences that alter children's social-cognitive beliefs in a positive direction can have a beneficial impact on their social behaviour and social acceptance.[32]

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The Development of Theory of Mind in Early Childhood

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Introduction

The most important development in early childhood social cognition is the development of theory of mind.[1,2] Its development during the first five years of life is described in this article, as well as factors that influence its development, and the consequences of its development for children's lives at home and school.

Subject

Social cognition is at the heart of children's ability to get along with other people and to see things from their point of view. The basis of this crucial ability lies in the development of theory of mind.[3,4] "Theory of mind" refers to our understanding of people as mental beings, each with his or her own mental states – such as thoughts, wants, motives and feelings. We use theory of mind to explain our own behaviour to others, by telling them what we think and want, and we interpret other people's talk and behaviour by considering their thoughts and wants.

Problems

The development of theory of mind from birth to 5 years of age is now well described in the research literature[4,5] – or at least, we can describe how infants and children behave in experimental situations as well as in natural settings. There are problems, however, in interpretation of the findings. Some researchers claim that even babies are aware of other people's thoughts and wants while others think that this understanding does not develop until the toddler or preschool years. This contradiction can be resolved by taking a developmental view of theory of mind – that is, early-developing intuitive awareness later becomes more reflective and explicit.[5] Moreover, children's developing language abilities play an important role in this transition.[6]

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Research Context

Children's awareness of thoughts, wants and feelings is inferred from what they say and do in naturalistic and experimental situations. Natural settings show the child's abilities to interact with others in the real world.[7] Experimental settings, where children are questioned individually about hypothetical scenarios, reveal the precise level of a child's independent understanding.[8]

Key Research Questions

1. What are the typical developments in theory of mind from infancy to age 5?
2. What factors, both those in the social environment and those internal to the child, influence the rate of development?
3. What are the consequences of theory-of-mind development for children's social competence and for their success in school?

Recent Research Results

Research shows that infants display behaviours that are important beginnings for theory-of-mind development (see details in Moore's and Sommerville's papers in the chapter on social cognition [9,10]).
By age 2, children clearly show awareness of the difference between thoughts in the mind and things in the world. In pretend play (e.g., pretending a block is a car), toddlers show that they can distinguish between an object – the block – and thoughts about the object – the block as a car.[11] They also understand that people will feel happy if they get what they want and will feel sad if they do not.[12] And at this age children see that there may be a difference between what they want and what another person wants.[13] This developing awareness is seen in children's language too: 2-year-olds talk about what they and others want and like and feel; when they are 3, they also talk about what people think and know.[14]

A crucial development occurs around 4 years of age when children realize that thoughts in the mind may not be true. For example, children are allowed to discover that a familiar candy box actually contains pencils, and then are asked what their friend will think is in the box, before looking inside it.[15] Three-year-olds assume that the friend will know it has pencils inside, just as they now do, but 4-year-olds recognize that the friend will be tricked, just as they were. Three-year-olds also do not remember that their own belief has changed.[16] If the pencils are put back in the box and they are asked what they thought was inside before opening it, they'll say "pencils"

not “candy” but 4-year-olds remember they thought it was candy. That is, 3-year-olds are not simply egocentric, i.e., thinking everyone knows what they know, rather, they come to understand their own minds and those of other people at the same time. By the age of 4 or 5 years, children realize that people talk and act on the basis of the way they think the world is, even when their thoughts do not reflect the real situation, and so they will not be surprised if their uninformed friend looks for candy in the box they know has pencils inside.

Some factors in the social environment influence the rate of typical development of theory of mind: for example, children show earlier awareness of mental states if their mothers talk about thoughts, wants and feelings,[17] and provide reasons when correcting misbehaviour.[18] Children with brothers and/or sisters are aware of mental states sooner than only children.[19] The rate of development is also influenced by children’s participation in pretend play,[20] their experiences of story-book reading[21] and of talking with others about past experiences.[22] Factors internal to the child that influence the rate of development include language abilities,[23] and cognitive abilities that control and regulate behaviour (known as executive functions).[24]

Research shows that theory-of-mind development has consequences for children’s social functioning and school success. Children with more developed theory of mind are better communicators and can resolve conflicts with their friends;[25] their pretend play is more complex;[26] their teachers rate them as more socially competent;[27] they are happier in school and more popular with peers;[27] and their school work is more advanced in some ways.[28] However, a well-developed theory of mind can also be used in antisocial ways, such as in teasing, bullying and lying.[29]

Research Gaps

We need to know more about how and why different environmental-social and child-cognitive factors affect the rate of theory-of-mind development, particularly regarding effective interventions for children whose theory of mind is less well-developed.

To date, the majority of studies involve middle-class, Western children. More research is needed with children from different backgrounds and cultures to investigate similarities and differences in theory-of-mind development.

How people act is governed not just by their thoughts and wants, but also by moral and social rules. Research is needed into how rule-based reasoning and theory of mind operate together in social cognition.

More research is also needed into the brain processes underlying theory of mind.

Conclusions

Theory of mind develops gradually, with intuitive social skills appearing in infancy and then reflective social cognition developing during the toddler and preschool years.

Three-year-olds know that different people may want, like and feel different things. By age 4 or 5, children know that people may think different things. They understand that sometimes a person may believe something that is not true but, in that case, what the person does or says is based on the false belief.

There are differences in the rate of typical development that partly depend on factors in the environment, such as family talk and disciplinary strategies, interaction with siblings, story books and pretend play, as well as factors in the child, such as language and cognitive control abilities.

There are consequences to theory-of-mind development that are seen in children's social competence and success in school.

Implications for Parents, Services and Policy

Theory of mind is at the base of children's social understanding. The implicit theory of mind seen in infants becomes more explicit during the preschool years and provides an important foundation for school entry.

Theory of mind is more like language than literacy, in so far as it is a system with biological roots that develops without specific teaching.

Nonetheless, environmental factors do influence its development. It can be enhanced by opportunities:

- to engage in rich pretend play;
- to talk about people's thoughts, wants, and feelings, and the reasons why they act the way they do;
- to hear and talk about stories, especially those involving surprises, secrets, tricks, and mistakes, that invite children to see things from different points of view (for example, Red Riding Hood doesn't know that the wolf is dressed up as grandma).

Parents and caregivers can be made aware of signs, such as lack of pretend play or lack of shared attention and interest, that might indicate theory of mind is not developing in the typical

way, which is the case with children at risk for autism, for example.[30]

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Early Social Cognition: Comments on Astington and Edward, Miller, Moore and Sommerville

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Introduction

Astington and Edward,[1] Miller,[2] Moore,[3] and Sommerville[4] have provided excellent reviews of the development of social cognition in the early years. As noted across these contributions, early manifestations of social cognition include an understanding of intentionality, goals and motives, the ability to label others' emotions, the development of theory of mind (ToM), and other abilities that reflect the capacity to interpret one's own and other people's internal experiential and mental states. These authors also raised a number of pressing research questions such as the following: How do children acquire socio-cognitive knowledge? How do biological and environmental factors jointly contribute to the development of social cognition? What are the social consequences of changes in socio-cognitive skills? These authors briefly reviewed some of the literature relevant to these issues, but there is still much to learn.

Subject

Perhaps the primary reason for studying the development of social cognition is that it is believed to affect the quality of children's social interactions. This issue is more complex than just examining if there is an association between level of social cognition and quality of social behaviour; additional, more nuanced questions can be raised. For example, many of the sociocognitive skills that young children develop emerge over a relatively brief span of time (e.g., a couple of years). For instance, there is generally considerable individual variation in children's level of ToM at age three or even four, but by age six, variation is limited on the typical ToM tasks because most children have achieved an understanding. An important question, then, is: Do individual differences in a given sociocognitive skill (e.g., ToM) during the period that it emerges relate not only to concurrent indices of social functioning, but also to subsequent individual differences in the quality of social functioning after most children have achieved a given skill? Or is variation in regard to an early sociocognitive skill primarily predictive of quality of social

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functioning concurrently and up to the point that acquisition of the given skill is normative?

Research and Conclusions

Eggum et al.[5] found a pattern of data consistent with the view that early sociocognitive skills predict high-quality social functioning across time whereas the same sociocognitive skills were not predictive when assessed after an age at which many children achieve a high level of the given skill. They assessed ToM at 54 and 72 months of age, as well as children's prosocial behaviour and sympathy. ToM scores at 54 months, but not 72 months, were related to concurrent and future adult-reported prosociality and sympathy. Similarly, a measure of children's ability to label others' emotions (e.g., sadness, fear, anger, happiness) at 30 months was a somewhat better predictor of prosocial responding in subsequent years than their understanding of emotions at an older age. These findings suggest that sociocognitive skills are most predictive of the quality of social interactions − both concurrent and in the future − if measured at the age when the given skill is rapidly emerging, and that early social cognition can predict the quality of children's social functioning across time.[6]

If individual differences in a sociocognitive skill are found to reliably predict quality of social behaviour at an older age when most typically developing children have achieved the given skill (so the given skill at the older age is unlikely to account for variation in social functioning), there are at least two explanations for the relation. First, relatively stable biological/genetic and environmental (e.g., parenting) factors may affect not only the emergence of more rudimentary sociocognitive skills, but also the development of other, later developing sociocognitive skills, which in turn influence children's social behaviour at the older age. Alternatively, or in addition, it is possible that children who are initially advanced in their sociocognitive abilities develop superior social skills and patterns of social interaction at a young age, and these social assets set into motion a trajectory or cascade of positive interactions with others that contribute to the development of subsequent, more mature social/interactional skills (regardless of whether the child continues to possess superior social cognition). More information on the processes underlying relations between early social cognition and later social behaviour is sorely needed.

Another important question is which sociocognitive skills are related to what aspects of social interactions. As noted by Miller[2] and Eisenberg,[7] individuals can have relatively sophisticated social cognitive skills but use such skills to harm others. Whether an individual uses the information acquired through social cognitive processes to assist, manipulate or harm others

probably depends on the actor's values and own needs, and if the given social cognitive skill is likely to activate empathy and especially sympathy.[7,8]

For example, most ToM tasks assess only the understanding that others have different information or wants than the self, rather than an understanding that people have different feelings (although the latter may be correlated with the skills assessed by typical ToM tasks). Such information does not have a direct tie to the quality of an individual's social behaviour except for reducing the probability of a person misreading situations and, consequently, engaging in inappropriate behaviour. It seems unlikely that an understanding that other people possess different information based on their own unique experiences with objects is, for example, substantially related to the tendency to experience sympathy or empathy for others, and hence, to engage in prosocial behaviour.[9] In contrast, the ability to label emotions, to comprehend that contexts often elicit specific emotions from people even if they do not exhibit the emotion, and to understand how emotions affect behaviour may be more likely to predict cooperative, prosocial actions. Consistent with this view, Eisenberg et al.[8] found that adolescents' cognitive perspective taking was not directly related to their prosocial behaviour; it was related to prosocial behaviour only to the degree that it was related to youths' moral reasoning and sympathy (i.e., moral reasoning and sympathy fully mediated relations of cognitive perspective taking to prosocial behaviour). Moreover, there is some evidence that an understanding of others' affect is more consistently related to prosocial behaviour than an understanding of others' cognitions.[6] Thus, some sociocognitive skills may be more likely than others to predict specific aspects of social behaviour. Important questions for the future are which social cognitive skills are most likely to contribute to positive versus negative social interactions and do such associations change with age?

Even if investigators find consistent relations between the development of social cognitive skills and a given aspect of social functioning, one cannot, of course, assume causality. It is quite possible that quality social interactions stimulate the development of social cognition; this idea is consistent with the research discussed in some entries on the relation between quality of parenting interactions and the development of children's social cognition. In addition, a variety of third variables likely affect both the level of children's social cognition and the quality of their social interactions. Two such variables may be the quality of parenting and language development.[6] Another could be demographic risks (e.g., poverty) that can produce stress, reduced learning opportunities, and health problems, all of which could affect cognition and

behaviour. A fourth variable is children's self-regulatory skills and executive functioning. For example, children who are low in the ability to inhibit thoughts and behaviour tend to be low in both understanding theory of mind[10] and social competence.[9,11] To further complicate matters, self-regulatory/executive functioning skills are associated with quality of parenting and biological/genetic factors,[12] so it is difficult to sort out the unique influence of these different variables on each other, as well as on the association between sociocognitive and social functioning.

A final issue mentioned by Astington and Edwards[1] as well as Sommerville[4] is the need to consider culture when examining the development and correlates of social cognitive skills. As discussed by Lillard,[13] cultures appear to vary in their conceptions of the function of the mind and in the need to explain behaviour and internal states. Therefore, cultures likely differentially encourage attempts to understand others' mental states. In cultures that do not encourage these skills, in comparison to those that do, the development of social cognitive skills may be slower and related to fewer (or different) aspects of competent social interaction. More attention to cultural (as well as familial) influences on the early development of, and individual differences in, social cognitive skills is needed to more fully understand these issues.

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Is Social Cognition an Oxymoron? Comments on Astington and Edward, Miller, Moore and Sommerville

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Introduction

Navigating the complexities of the social world is more than mind-reading based on theory building, cold calculations and logical inferences. It also entails the experience of a relative sense of comfort and connectedness with others. We tend to forget that this feeling experience is the main content and driving force behind so-called social cognition: "thoughts and beliefs about the social world."[1]

Here, I want to stress that theorizing about others' minds might not be as essential or foundational of social cognition as typically presented and often implicitly assumed by child development researchers like Miller, Astington, Moore and Sommerville.[1,2,3,4] In fact, I would like to argue that to talk of social cognition in a "cold" Cartesian or "rationalistic" sense is incomplete and might even be oxymoronic: a contradiction in terms.

Research and Conclusions

As recently suggested by Gallagher,[5] the validity of the "theories of mind" frame adopted by mainstream developmental researchers interested in documenting the origins of social knowledge might be ill-founded, or at least potentially lacking validity.[6] Current mainstream framing of social cognition, as represented (broadly speaking) by Miller,[1] Astington,[2] Moore[3] and Sommerville[4] in the chapter on social cognition, posit (implicitly or explicitly) that the problem of social cognition is the problem of other minds' "inaccessibility."

Accordingly, within such conceptual framework, for these authors – as for many others – the ultimate task of children in their development, and in particular in the social realm, would be to rationally figure out what is going on in people's heads: figure out their intentions, wants or beliefs. Such rational figuration would allow them to accurately predict their behaviours, hence

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get access to others' minds.

Within such an inaccessibility problem construal, two main schools of thought have been guiding research and have been at the heart of major theoretical debates for the last quarter of a century.

One school posits that the rational figuration of others' mind (i.e., folk psychology) is based on theory building and inferences derived from such theories.[7,8] The other school posits that folk psychology rests on an ability to take, as well as to embody the perspective of others.[9,10,11]

What is striking and what readers should be reminded of is the fact that both schools conceptualize social cognition not only in relation to a fundamental inaccessibility problem, but also by focusing exclusively on the child's individual and rational mind. Here, too briefly, I want to point out that the validity and degree of generalization of such theoretical framing is partial and therefore questionable in its validity. I would argue that it allows dealing with what amounts to a relatively narrow aspect of folk psychology in development (i.e., the rational figuration or explicit representation of what's on the minds of others). But folk psychology entails much more than the explicit mental figuration of others' minds, more than a rational stance on the part of the developing child.

For one, it is not clear that infants manifest an "inaccessibility" problem, at least at an implicit level. Within weeks infants manifest selective attachment to caretakers on which their life depends. This is fundamental, considering humans' particularly prolonged state of immaturity following birth, and their protracted dependence on others to survive outside of the womb: a major trademark of our species compared to other primates.[12,13]

There is an abundant experimental research literature documenting young infants' attunement as well as social intuitions, expectations and practices in face-to-face exchanges (primary inter-subjectivity[14,15]). Newborns tend to imitate, and very early on infants react to a sudden still face or become attuned to ritualized games with others (e.g., peek-a-boo games[16]). From 6 months of age, they expect animated entities with human-like features (e.g., googly eyes) to behave in some pro-social ways (act in a helping way) and not others (act in a hindering way[17]).

Such sophistications indicate that implicit social understandings exist long before children acquire language, and long before they are capable of theorizing that others might have different wants and false beliefs about the state of the world.[3]

This point is not trivial. What infants seem to acquire from birth (social intuitions, communicative practices, affective attunement around shared values) is arguably most of what folk psychology is about all through the lifespan. As adults, we continue to navigate the social world mainly in terms of relative experience of intimacy and trust, of social comfort, and what amounts more often than not to the immediate sense of inclusion and recognition in our interactions with others. The immediacy aspect of such intuitions toward others (e.g., whether someone is more or less well disposed toward us) is a cornerstone of social cognition. This intuitive and affective aspect is neglected and tends not to be captured when framed within the inaccessibility problem and its corollary: the individualistic ("Cartesian") approach of mind reading.

What such approach is missing is no less than the question of what drives children to understand and feel for others. What drives their irresistible need to affiliate and create resourceful (selective) dependencies, the ability to construct "trust" and a consensual sense of shared values with other persons.

The mechanisms that lead children toward such feats (i.e., their construction of a folk psychology) are much more than explicit theory building, logical inferences, and rational perspective taking. It is the development of a sense of social comfort and feelings toward others, the sense of being recognized and cared for by selected individuals, and the ability to control the projection of a reputable public self-image.[18,19]

In this context, social cognition can be viewed as an oxymoron (contradictory in terms), to the extent that the folk psychology developed by children is primarily the development of implicit feelings and the ability to read the particular affective inclinations others have toward the self in communication and social transactions with others (first- and second-person perspective), as well as toward one-another when looking at third parties' communication and social exchanges (third-person perspective). It is indeed much more than theory building or embodying (simulating) the perspective of others. Social cognition is primarily rooted in implicit exchange practices, communicative styles and varieties of social atmosphere that deserve much more research scrutiny.

Detecting how one relates to others at an implicit affective level has precedence over explicit theories of mind. This appears to be true both in development and in our daily adult existence. In navigating the social world, like infants, we rely primarily on our "instincts." We are first social feelers rather than theorizers or simulators of others. We tend to experience others as ethical,

affective, and judging entities with immediacy and without much rationalization. I would argue that what seems to be primary in social cognition are not theories of mind, but rather sets of shared values and practices that can be subconsciously primed in infants and adults alike.

Little is known and much more research is needed on the implicit (atmospheric) feelings one acquires in relation to others, and how such feelings impact on our explicit folk psychology (i.e., theories of mind and other simulation stances). For example, Over and Carpenter's[20] recent findings on social priming by 18-month-olds provide a remarkable demonstration. These children appear to be more inclined to help a stranger when they have been briefly and inconspicuously primed beforehand with the photograph of two small puppets facing toward each other rather than facing away from each other. These findings show the importance of immediate, subconscious processing and incidental learning in the determination of higher order and explicit social actions such as empathic (feeling for) and cooperative (helping) behaviours. Note that such behaviours tend to be described as correlated with slow developing higher cognition and executive functions.

We now know that such higher order pro-social acts do not simply depend on language and the construction of explicit theories of mind. Something much more implicit and subliminal is going on.

Research on social priming is promising as it re-casts the development of folk psychology in a more interactive and inter-subjective ("implicit") construction context, away from the individualistic and rational framing ("the others' mind inaccessibility problem") that continues to dominate mainstream child development research.[1,2,3,4]

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Early Social Cognition

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Introduction

Most definitions of social cognition in early childhood center on children's awareness of their own and others' thoughts, feelings, beliefs and intentions (aka "theory of mind") but from a policy angle at least, both competence and performance perspectives are important. Thus, while some interventions improve children's social understanding, others focus on applying this understanding to promote relationship skills (e.g., via good emotion regulation or positive strategies for avoiding or resolving conflict).

Subject

Social cognition has broad clinical and educational relevance. Although early work suggested that deficits were restricted to children with autism,[1] impairments have since been identified in several groups of children, including those with specific language impairment[2] or conduct disorder,[3] or late-signing deaf children.[4] More broadly, programmes to promote social and emotional learning are available across the globe, often supported by the Collaborative for Academic, Social and Emotional Learning (CASEL).[5]

Problems

For the policymaker, key issues in this field concern the importance of:

1. charting key developmental milestones in social cognition;
2. identifying outcomes associated with individual differences in social cognition;
3. elucidating the origins of these individual differences;
4. devising multi-pronged interventions for schools, families and communities.

Research Context

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Early studies of social cognition relied on children's responses to forced-choice questions about story characters (e.g., does he feel happy or sad). More recent research involves an array of methods that include asking open-ended questions (e.g., why does he feel that way?), direct observations (e.g., play between friends or siblings, or parent-child shared reading), open-ended child interviews and non-verbal paradigms for infants. Each has different strengths and weaknesses, such that multi-method studies are recommended.

Key Research Questions

Four research questions follow from the key problems outlined above.

1. What are the developmental milestones in social cognition?
2. How stable and meaningful are individual differences in social cognition?
3. What predicts individual differences in social cognition?
4. What kinds of interventions are effective?

Recent Research Results

With regard to development, recent findings highlight both continuity and change: infants show much more social awareness than previously thought, but this awareness is implicit and intuitive, rather than explicit and reflective.[6] Thus school-based interventions (e.g., PATHS[7]) often focus on ways of helping children to reflect on what they already know implicitly about other people's thoughts and feelings.

Theory-of-mind skills at age 3½ predict unique variance at age 6 in children's theory-of-mind skills and in their talk to friends about thoughts and feelings – even controlling for effects of language ability at both time-points.[8] Preschool theory-of-mind skills have also been found to predict academic success up to four years later.[9-11]

In turn, preschool individual differences are predicted by child factors, such as impulse control, planning and language abilities,[12] and family factors, such as secure attachment relationships with caregivers, family talk about thoughts and feelings and the presence of siblings.[13] The sibling effect is especially striking because it runs counter to the advantage shown by first-born or only children on general cognitive outcomes.[14] Possible explanations include the increased opportunities siblings provide for pretend play, for teasing, provocation and engaging in (and

eavesdropping on) family conversations about differences in points of view.

These findings highlight the importance of helping parents to form close relationships with their children from infancy, to build up the skills needed to foster their children's awareness of thoughts and feelings and to provide regular opportunities for their children to play with other children. Although effective internet-based programs have been developed,[15] family-based interventions are not yet widely available and remain poorly evaluated. One exception, the Play and Learning Strategies intervention (PALS), highlights the need for sustained support from infancy to preschool. Specifically, while the infancy phase of PALS greatly increased maternal warmth, only a double-dosed intervention (delivered across infancy and toddlerhood/early preschool) increased maternal cognitive responsiveness.[16]

School-based interventions to promote social and emotional learning take a variety of forms, including team sports (to encourage cooperation with peers), cross-age mentoring, and pairing children up to practice reflective listening. Interventions also differ in terms of whom they are aimed at: many seek to improve all children's opportunities for social and emotional learning (and so involve the whole school community) but some are targeted at particularly vulnerable/problematic cases (and often can only produce positive changes through close partnership with families). A recent meta-analysis[17] of school-based interventions has revealed clear benefits in three broad areas: children's feelings, adjustment and achievement.

However, a closer look suggests a more complex picture. First, echoing findings from family-based interventions, reviews for the UK's National Institute for Clinical Excellence (NICE) highlight the need to supplement preschool interventions with later booster programmes.[18] Second, the processes linking understanding to behaviour (or competence to performance) differ for distinct groups of children. For example, among children who bully, only those who are also victims of bullying show deficits in social cognition.[19] Conversely, high empathy scores predict the likelihood of defending victims of bullying, but only among popular children.[20] Similarly, research on "Machiavellian" children[21,22] highlights the importance of distinguishing between children's ability to understand others, and how children apply this understanding in their everyday social lives.

Research Gaps

Longitudinal studies remain remarkably scarce, and this gap significantly constrains conclusions about underlying processes. Another research gap concerns gender as a useful lens for examining links between competence and performance, as gender differences are particularly clear for social behaviour rather than social cognition.[23] With regards to families, while negative effects of maternal depression on young children's behaviour are well established,[24] researchers have yet to assess whether social cognition plays a mediating role in these effects. Finally, much more work is needed to elucidate the key elements of successful interventions.

Conclusions

These results support four policy-oriented conclusions. Specifically, social cognition:

1. begins early in life, with progress from infancy to school-age reflecting a shift from intuitive to reflective understanding;
2. predicts both academic and social success, although these predictive relationships depend on interpersonal factors (e.g., peer status);
3. varies according to both child factors (e.g., language, executive functions) and family factors (e.g., responsive parenting, sibling relationships);
4. can be improved through interventions, but these should be multi-pronged, sustained and if possible tailored to suit children with different cognitive and social profiles.

Implications for Parents, Services and Policy

Families: Two simple means of promoting family discourse about thoughts and feelings are engaging children in: (i) conversations about shared experiences/future activities; and (ii) shared reading of picture books. Children with proficient executive functions (e.g., good planning skills, self-control, cognitive flexibility) also show superior social cognition and variation in executive function is related to both positive (e.g., parental scaffolding of goal-directed activities) and negative (e.g., inconsistent parenting and family chaos) aspects of family life.[25] Sibling interactions are also important: because of their shared humour/interests, siblings are often wonderful partners for joint pretend play, while sibling disputes provide opportunities to reconcile differences in points of view.

Service providers: Children with poor social cognition are at raised risk of: (i) entering into coercive cycles of violence in response to harsh parenting;[26] (ii) difficulties making the transition

to school[13] and (iii) displaying pragmatic difficulties that get misread as “conduct problems”, such as “insolence” towards teachers.[27,28] Conversely, although children with good socio-cognitive skills typically do well, they may show increased sensitivity to teacher criticism[29] or apply their social understanding to deviant goals (e.g., becoming “ringleader bullies”[30]). Interventions therefore require a dual focus to ensure that improvements in social cognition lead to improved self-esteem and peer success.

Policy makers: Family policies that foster close and supportive parent-infant relationships (e.g., generous maternity/paternity leave, support for parents experiencing postnatal depression) are important, but need to be supplemented by interventions in the toddler to preschool years. Educational initiatives that foster social and emotional learning are promising, but should extend beyond child factors to consider children’s social environments (e.g., popularity with peers, or peer victimization). Finally, policies are needed to improve clinicians’ awareness that children with specific language impairments or conduct problems (as well as children on the autism spectrum) often show difficulties in social cognition.

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Social Cognition: Comments on Hughes and Lecce

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Introduction

In their article, Hughes and Lecce[1] focus on children's early social cognition, which includes theory of mind (i.e., the understanding that a child's thoughts and feelings may differ from those around him/her), emotion understanding and social competence. The article also adds to research in this area by emphasizing policy and intervention. The authors review research demonstrating that poor social cognition has been associated with several childhood impairments and disorders, such as autism, language impairment and conduct disorder. This research has also spawned the development of many programs that target social and emotional skills. Children's social cognition develops primarily during the preschool years and helps lay the foundation for later academic success, making this time period critical for intervention development and implementation.

Research and Conclusions

Hughes and Lecce[1] outline key issues for policymakers in the field of social cognition, including: identifying developmental milestones and predictors of children's outcomes and developing effective interventions. Research in social cognition is quite timely given its relevance for both practitioners and educators. As Hughes and Lecce[1] note, there are stable individual differences in social cognition, but social cognition is subject to developmental change. Whereas infants demonstrate social comprehension skills implicitly, preschool-aged children's skills are more explicit.[2,3] Moreover, preschoolers' social skills are predicted by early theory of mind skills.[3] In other words, children's ability to get along with others depends on being able to take another perspective other than their own. For example, being able to share requires that a child understand that another child might want to play with the same red truck that he/she is playing with.

Hughes and Lecce[1] also discuss important factors associated with social cognition, such as child and family factors. As the authors indicate, individual differences in social cognition are

important in the context of intervention, and influenced by child and family factors.[4-6] One child factor mentioned by the authors is the ability to control impulses and plan, which are aspects of children's early executive function. Executive function helps children flexibly manage their thoughts, feelings and behaviour, and is an important predictor of social cognition. For example, being able to control behaviour and manage emotions are key for taking another person's perspective and getting along with others. In addition, as noted by Hughes and Lecce,[1] gender differences in social cognition are an essential focus, with research showing that girls have stronger language ability and executive function, both of which are related to social cognition.

Importantly, along with social cognition, executive function is also related to family factors such as parenting.[7] For example, parents who appropriately guide their children during activities are more likely to have children who can control impulses, manage emotions and develop strong social cognition, whereas children with poor self-control are more vulnerable to family instability and chaos.[7] In addition, maternal behaviours such as sensitivity and autonomy support help develop social cognition and executive functions. A recent study found that maternal sensitivity, mind-mindedness and autonomy support were associated with executive functioning in young children, with autonomy support being the strongest predictor.[8] In other words, parents who provide opportunities for children to be independent are likely to have strong executive function skills, which are also important for social cognition.

In addition to the research reviewed by Hughes and Lecce,[1] future areas of inquiry can focus on identifying specific pathways leading to strong social cognition in children. For example, although research has documented a strong link between children's social cognition and language development,[3] relations among social cognition, executive function, and outcomes such as children's academic achievement are less clear. Recent research, however, has started elucidating some of these pathways. For example, Blair and Razza[9] reported that how well children understood that reality could be perceived in different ways (one aspect of social cognition), predicted early academic achievement in addition to executive function skills. Some research has also started to specify the complexity in these relations. In one study, children's emotion knowledge (also an aspect of social cognition) predicted their academic competence, including math and literacy skills and motivation.[10] In addition, children's language skills predicted their emotion knowledge, which then predicted academic competence. In other words, children who can communicate effectively with others are more likely to manage their emotions appropriately, which in turn, predicts stronger academic competence. Moreover, as noted by

Hughes and Lecce,[1] children with strong social cognition are better able to direct their attention and behaviour to learning tasks and succeed academically.[9] In order to develop effective interventions, however, more research is needed that identifies the specific pathways for predicting strong social cognition in young children.

Research that focuses on key mechanisms and complex relations is especially important because intervention effectiveness often differs based on the factors identified by Hughes and Lecce.[1] These include the target population; the length of intervention, and whether subsequent booster programs are available. Interventions also differ in their effectiveness for different groups of children. For example, a growing body of research shows that children growing up in the context of risk are more likely to struggle with social cognition and executive function skills.[11] However, strong social cognition and executive function can also play a compensatory role for at-risk children.[12] In general, our suggestions echo those of Hughes and Lecce[1] and also highlight the importance of specifying pathways of influence for different outcomes.

Implications for Development and Policy

The research findings reviewed by Hughes and Lecce[1] have implications for families, service providers and policy makers. For families, positive interactions and quality home learning environments promote strong social cognition. For example, parents who demonstrate appropriate social and emotional skills through conversation and interaction with their child support the development of social cognition.[13] Social cognition is also strengthened through peer interactions, although these relationships are both complex and transactional. For example, children with strong social cognition tend to have more positive peer relationships, and positive peer interactions lead to strong social cognition. Parents can foster positive peer relations by teaching and helping their child practice appropriate social behaviours.

For direct service providers, research can be used to develop and improve the effectiveness of intervention for young children. Hughes and Lecce[1] indicate that varying levels of social cognition can be observed in the classroom and that service providers need to be able to identify children with poor social cognition in order to support them in classroom settings. Service providers can also use research on specific pathways of influence to develop and improve interventions. For example, research suggests that children with difficulty communicating may also have poor executive function and social cognition skills which could negatively impact academic achievement and school success.[3,9] Thus, in addition to following Hughes and Lecce's[1]

recommendations, providers who develop interventions to improve school achievement may want to include these factors.

Hughes and Lecce[1] also provide several recommendations for policy makers, including multi-faceted family and educational initiatives, as well as policies geared toward clinicians. The complexity of the relations between social cognition and children's outcomes also deserves consideration for policy development. For example, interventions could be especially beneficial to certain groups of children (e.g., children exposed to cumulative risk such as low socio-economic status, single parent households and family chaos). Moreover, strong social cognition can be a protective factor for at-risk children. Intervention programs and policies are likely to be most effective when researchers, service providers, practitioners and policy makers, work together to foster healthy development in young children.

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