CHAPTER 26

AUTISM, EMPATHIZING-SYSTEMIZING (E-S) THEORY, AND PATHOLOGICAL ALTRUISM

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KEY CONCEPTS

- Empathy involves two very different neural processes: affective (feeling an emotion appropriate in response to another person's thoughts and feelings) and cognitive (also called Theory of Mind—that is, being able to imagine someone else's thoughts or feelings).
- The ability to empathize forms one pole of a personality-related dimension; the opposite pole is the ability to systemize. (Put briefly, systemizing is the drive to create and understand systems, for example, the mechanical system of an old-fashioned clock).
- On average, empathizing is stronger in females, whereas systemizing is stronger in males.
- Empathizing-Systemizing theory can be used to quantify people's drive to empathize and systemize. More importantly, it makes predictions regarding the origins of conditions such as autism, which involves intact or even strong systemizing alongside difficulties in empathy.
- Empathizing-Systemizing theory also predicts that some individuals will have difficulties systemizing, but an intact or even a strong drive to empathize. These "hyper-empathizers" may escape clinical notice.

CLASSIC AUTISM AND Asperger syndrome involve problems in social interactions and communication, and also manifests in the display of narrow interests and repetitive actions. It is thought that children with autism and Asperger syndrome may be delayed in developing a *theory of mind* (ToM)—that is, their ability to understand the thoughts and feelings of others (Baron-Cohen, 1995; Baron-Cohen, Leslie, & Frith, 1985). These children may also have difficulty in themselves evincing, or in understanding others' emotions (Davis, 1994; Grandin, 1996). Empathizing-systemizing (E-S) theory has been proposed to help explain some of these behavioral syndromes.

The Empathizing-Systemizing (E-S) Theory

E-S theory explains the social and communication issues seen in autism and Asperger syndrome in connection, on the one hand, to delays and deficits in *empathizing*. The strengths in assimilating narrow areas of interest, on the other hand, involve an intact or even superior skill in *systemizing*[1] (Baron-Cohen, 2002, 2008, 2009; Lawson, Baron-Cohen, & Wheelwright, 2004).

E-S theory predicts five different "brain types" (as noted in Baron-Cohen, 2008):

- *Type E* ($E > S$): individuals whose empathy is stronger than their systemizing
- *Type S* ($S > E$): individuals whose systemizing is stronger than their empathy
- *Type B* ($S = E$): individuals whose empathy is as good (or as bad) as their systemizing. (*B* stands for "balanced.")
- *Extreme Type E* ($E >> S$): individuals whose empathy is above average, but who are challenged when it comes to systemizing
- *Extreme Type S* ($S >> E$): individuals whose systemizing is above average, but who are challenged when it comes to empathy.

The E-S model predicts that females will tend toward type E, whereas males will tend toward type S. This, in fact, jibes with actual results, which show that the majority of males (54%) test as type S, whereas the majority of females (44%) test as type E (Baron-Cohen, 2009).

The Extreme Female Brain: Pathological Altruism?

Laying out the main brain types in the E-S theory raises the question as to why the fifth possibility has not been previously discussed. This is the profile $E >> S$, in which an individual may have below-average systemizing, alongside intact or even superior empathy. Mapping the E-S space predicts such individuals should exist, and indeed our questionnaire study using the Empathy and Systemizing Quotients (*EQ* and *SQ*) identified that such individuals do exist (Goldenfeld et al., 2005; see Figure 26.1). To date, no lab has called in such individuals for in-person testing, but it is worth considering what they should be like. First, we should expect more females than males to show this profile; the Goldenfeld et al. (2005) dataset confirms this prediction. Second, their sex ratio should be the mirror image of the autism sex ratio; again the Goldenfeld et al. (2005) dataset confirms this prediction.

In terms of everyday functioning, we would expect high-E individuals to avoid systemizing subjects such as science, technology, mathematics, or engineering at school, university, or on the job. At the same time, these high-E individuals would find subjects or jobs that involve empathy, such as listening, communicating, socializing, or supporting others, trivially easy. Consequently, high-E individuals would be drawn toward people-centered occupations such as counselling, working with children, teaching, and social work. This latter prediction has never been tested, but it would be straightforward to do so. This group should constitute an extreme of the female brain, using the earlier terminology. More descriptively, it should also constitute an extreme of type E.

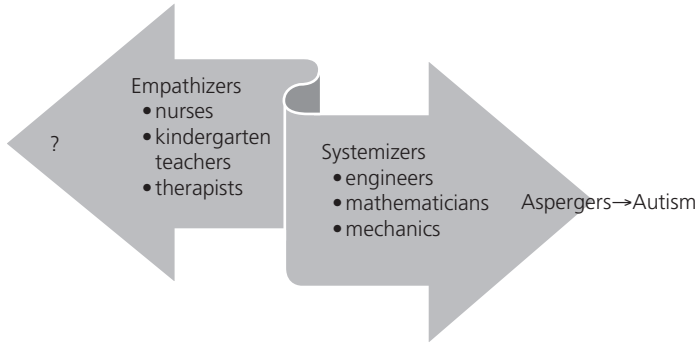

FIGURE 26.1
Just as we can divide people up by their tendencies toward extroversion or introversion, we can also divide people up by their tendencies to *empathize* or *systemize*. Empathizers are more interested in people—what they feel and why they think what they think. Systemizers are people who like to figure out the rules embedded in systems such as car engines, train time-tables, dance routines, or stamp collections. Illustration courtesy of Barbara Oakley.

Relevant to this book is the question of whether such individuals would have clinically significant difficulties, and what they would look like on an altruism dimension. One view is that such a profile need not lead to any clinical difficulties. Autism features empathy difficulties that form a high-risk factor for clinical difficulties such as social isolation. But in the case of the extreme type E profile, strong empathy may well be protective, since social networks may be easier to form and maintain, such that the individual is not isolated. The individual with an extreme type E profile has difficulties with systemizing, and this may simply mean that occupations such as engineering or mathematics would be avoided. In this view, such individuals may not come to the attention of researchers because they do not find their way to clinics. They may well be more likely to empathize with others' difficulties, and so take on other people's problems more than others might. Whether such "altruism" might become pathological would need to be investigated. Indeed, it raises the question of the optimal limit of altruism. At one extreme are individuals who are so self-centered that their altruism is minimal, and at the other extreme are individuals who devote most of their time and attention to others rather than to themselves. Missing from this model is any sense of where on this continuum behaviour becomes pathological. Presumably, when someone is so other-focused that they neglect their own basic needs for food, money, and other resources linked to survival, one can talk of pathology. But if people are comfortable devoting themselves to others, or using their high levels of empathy in altruistic ways, it

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Autism has a high risk for clinical difficulties such as social isolation. But strong empathy may well be protective, since social networks may be easier to form and maintain such that the individual is not isolated.

may be wrong to impose a value judgment on the behaviour by labelling it pathological.

In closing, we should also consider the causal factors that might lead an individual to have one brain type or another within the E-S space. Recent research suggests that prenatal androgens are one candidate factor that influences a child's later empathy (Chapman et al., 2006) and systemizing levels (Auyeung et al., 2006), and that genetic polymorphisms also correlate with *EQ* (Chakrabarti et al., 2009). Undoubtedly, environmental factors may also contribute, although these remain to be investigated.

Conclusion

In this chapter, we have considered a psychological theory of autism spectrum conditions (the E-S theory) and its link to typical sex differences in the general population. It was argued that E-S theory may not only be useful as a way of explaining the very broad range of features of autism spectrum conditions, but also for considering the mirror image of these disorders. Future research should focus on the extreme opposite of autism—that is, on individuals with excellent empathy but impaired systemizing—to understand if this is associated with any necessary clinical consequences.

Note

1. Major kinds of systems include the following (as noted in Baron-Cohen, 2002):

- *Collectible* systems (distinguishing between types of stones or wood)
- *Mechanical* systems (a video-recorder or a window lock)
- *Numerical* systems (a train time-table or a calendar)
- *Abstract* systems (the syntax of a language, or musical notation)
- *Natural* systems (the weather patterns, or tidal wave patterns)
- *social* systems (a management hierarchy, or a dance routine with a dance partner)
- *Motoric* systems (throwing a Frisbee or bouncing on a trampoline).

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