

us to understand and predict others' motives, intentions, thoughts, and emotions, so as to foster and maintain social relationships (Davis and Oathout, 1997). Deficit in empathic ability is a central feature of social behavioral abnormalities. For example, individuals with autism, which is a developmental disorder characterized by restricted interests, stereotyped and repetitive behaviors, as well as deficits in social interaction and communication (Gmitrowicz and Kucharska, 1994), show severe impairment in perspective taking (Baron-Cohen et al., 1985).

Empathic traits are strikingly variable among individuals. Twin studies showed that empathic traits are highly heritable, with a heritability of up to 67% for perspective taking and 34...47% for empathic response (

downstream primer, 5GTATGTTTCCAGCAAT-3. The PCR reaction was performed with an initial 5 min denaturation at 94 C, followed by 35 cycles of ~~92~~ for 30 s, 60C for 30 s, 72 C for 1 min, and a final extension period at ~~72~~ for 5 min. The PCR product was incubated with the restriction enzyme MspI (Fermentas) at ~~37~~ overnight in a 5

TABLE 3 | Results of mediation analysis after controlling for the scores on Empathic Concern subscale and/or the 1021C/T polymorphism in the DBH gene.

Control variable(s)	Indirect effect estimate	SE	Bias-corrected 95% confidence interval
IRI Empathic Concern	Š0.0071	0.0030	[

to misunderstand the intentions and behaviors of others and more likely to have difficulties in communicating with others. Our findings suggest a possible psychobiological mechanism underlying the genotype effect on deficits in social interactions.

Several limitations of this study should be noted. First, we demonstrated small effects of a single polymorphism on empathic and autistic traits while these traits are likely to

- longitudinal study from infancy to early adulthood. *Pers. Soc. Psychol.* 104, 817–838. doi: 10.1037/a0031435
- Freeth, M., Sheppard, E., Ramachandran, R., and Milne, E. (2013). A cross-cultural comparison of autistic traits in the UK, India and Malaysia. *Autism Dev. Disord.* 43, 2569–2583. doi: 10.1007/s10803-013-1808-9
- Galinsky, A. D., Maddux, W. W., Gilin, D., and White, J. B. (2008). Why it pays to get inside the head of your opponent: the differential effects of perspective taking and empathy in negotiations: research article. *Psychol. Sci.* 19, 378–384. doi: 10.1111/j.1467-9280.2008.02096.x
- Gerretsen, P., Gra -Guerrero, A., Menon, V., Pollock, B. G., Kapur, S., Vasdev, N., et al. (2010). Is desire for social relationships mediated by the serotonergic system in the prefrontal cortex? An [18F]setoperone PET study. *Neurosci.* 5, 375–383. doi: 10.1080/17470911003589309
- Gmitrowicz, A., and Kucharska, A. (1994). Developmental disorders in the fourth edition of the American classification: diagnostic and statistical manual of