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## The association between romantic relationship status and 5-HT1A gene in young adults

SUBJECT AREAS:  
HUMAN BEHAVIOUR  
BEHAVIOURAL GENETICS

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What factors determine whether or not a young adult will fall in love? Sociological surveys and psychological studies have shown that non-genetic factors, such as socioeconomic status, external appearance, and personality attributes, are crucial components in romantic relationship formation. Here we demonstrate that genetic variants also contribute to romantic relationship formation. As love-related behaviors are associated with serotonin levels in the brain, this study investigated to what extent a polymorphism (C-1019G, rs6295) of 5-HT1A gene is related to relationship status in 579 Chinese Han people. We found that 50.4% of individuals with the CC genotype and 39.0% with CG/GG genotype were in romantic relationship. Logistic regression analysis indicated that the C-1019G polymorphism was significantly associated with the odds of being single both before and after controlling for socioeconomic status, external appearance, religious beliefs, parenting style, and depressive symptoms. These findings provide, for the first time, direct evidence for the genetic contribution to romantic relationship formation.

**Introduction**

Love is a complex emotional state that involves a combination of biological, psychological, and social factors. While the biological basis of love has been extensively studied, the role of genetics in romantic relationship formation remains largely unknown. The 5-HT1A receptor gene (5-HT1A) is a candidate gene for love-related behaviors because of its role in serotonin signaling, which is known to be involved in mood regulation and social behavior. A polymorphism in the 5-HT1A gene, C-1019G (rs6295), has been associated with various psychological traits, including anxiety and depression. In this study, we investigated whether the C-1019G polymorphism is associated with romantic relationship status in young adults.

**Methods**

We recruited 579 Chinese Han young adults (mean age = 22.5 years) from a university in Beijing. All participants provided written informed consent before participating in the study. Genotyping for the C-1019G polymorphism was performed using PCR and RFLP analysis. Sociodemographic information, including socioeconomic status, external appearance, religious beliefs, parenting style, and depressive symptoms, was collected through a standardized questionnaire. Romantic relationship status was defined as being in a romantic relationship (married or in a dating relationship) versus being single.

**Results**

The C-1019G polymorphism was significantly associated with romantic relationship status. Individuals with the CC genotype were more likely to be in a romantic relationship (50.4%) compared to those with the CG/GG genotype (39.0%). Logistic regression analysis indicated that the C-1019G polymorphism was significantly associated with the odds of being single both before and after controlling for socioeconomic status, external appearance, religious beliefs, parenting style, and depressive symptoms.

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**Supplementary Materials**

Supplementary Materials are available for this article. For information on how to access this information, see the article's online version on the journal website.



**Table 1 | The effect of C-1019G (rs6295) polymorphism on the distribution of romantic relationship status**

	Genotype frequency			
	CC	CG	GG	Total
In a relationship	182 (50.4%)	72 (38.9%)	13 (39.4%)	267 (46.1%)
Single	179 (49.6%)	113 (61.1%)	20 (60.6%)	312 (53.9%)

Note. N = number of individuals being in a relationship (single). The percentages were computed by dividing the number of individuals in a relationship (single) with the number of individuals having a particular genotype.

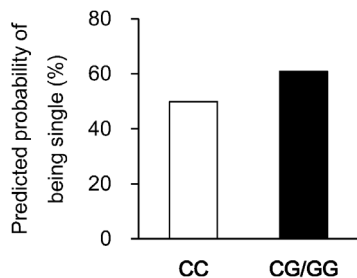
Supplementary Materials

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Discussion



**Figure 1 | Impact of the 5-HT1A C-1019G polymorphism on the predicted probability of being single after controlling for socioeconomic status, external appearance, religious belief, parenting style, and depression. Individuals with the CG/GG genotype were more likely to be single than individuals with the CC genotype.**

5-HT1A  
 5-HT1A  
 5-HT1A

Methods

% = ±

Supplementary Materials

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## Author contributions

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