

## Are there gender differences in trust levels?

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### Abstract

Whether gender differences exist in trust levels remains a contentious issue in academia. One camp of researchers advocates for the existence of gender differences in trust levels, with risk preference theory being employed to substantiate the argument that males exhibit higher trust levels, while females' advantages in the prosocial domain provide support for the notion that females possess higher trust levels; another camp of researchers, grounded in the gender similarity hypothesis, maintains that there are no gender differences in trust levels. Although both perspectives and their theoretical underpinnings have received some support, their validity remains to be elucidated from perspectives such as research paradigms and East-West cultural differences. Future research could, based on the appropriate application of trust measurement methods, clarify the gender-specific characteristics in the dynamic evolution of trust, deepen investigations into the neurophysiological mechanisms underlying gender differences in trust, thereby better illuminating the issue of gender differences in trust levels.

### Full Text

## Are There Sex Differences in Trust Levels?

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### Abstract

Do sex differences exist in trust levels? Academic opinions remain divided. One group of researchers holds the view that sex differences in trust levels do exist. Within this perspective, risk preference theory is used to support the claim that men have higher trust levels, while women's advantages in the prosocial domain provide support for the notion that women possess higher trust levels. Conversely, another group of researchers, grounded in the gender similarities hypothesis, maintains that no sex differences exist in trust levels.

Although both perspectives and their theoretical foundations have received some empirical support, their validity needs further clarification from the perspectives of research paradigms and cultural differences between East and West. Future research should employ trust measurement methods more rationally, clarify the gender characteristics inherent in the dynamic process of trust development, and deepen investigations into the neurophysiological mechanisms underlying sex differences in trust, thereby providing a more comprehensive understanding of this issue.

**Keywords:** trust, gender, trust game

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Trust is defined as a psychological state characterized by positive expectations of others' intentions or behaviors and a willingness to accept vulnerability (Rousseau et al., 1998; Zhang et al., 2011). From the domain general-specific perspective, trust can be divided into general trust and specific trust. The former primarily represents an individual's general, relatively stable trust propensity or trait without a specific target, while the latter refers to trust directed toward a particular individual or category (Gong et al., 2021). As one of humanity's fundamental preferences, trust is closely related to interpersonal interactions such as reciprocity, cooperation, and betrayal (Lemmers-Jansen et al., 2017), exerts important influence over individual behavior (Falk & Hermle, 2018), and serves as both the lubricant for maintaining normal social functioning and the adhesive for social integration (Yan & Wu, 2016). Without trust, social life and economic interactions would cease to exist (Derks et al., 2014).

In the field of trust research, scholars have employed multiple methods to investigate the mechanisms of trust formation and individual differences (Buchan et al., 2008; Falk & Hermle, 2018; Macko, 2020; van den Bos et al., 2010; Zeffane, 2018; Xin & Zhou, 2012). As the most fundamental and core demographic variable, gender has become a critical entry point for exploring the mysteries of trust, attracting considerable research attention (Buchan et al., 2008; Dittrich, 2015; Derks et al., 2014; Furumo & Pearson, 2007; Haselhuhn et al., 2015; Lemmers-Jansen et al., 2017; Macko, 2020; Zeffane, 2018). On one hand, trust plays a key explanatory role in understanding sex differences in career choices (Zeffane, 2015), economic interactions (Garbarino & Slonim, 2009), interpersonal communication (Navarro-Carrillo et al., 2018), and social cooperation (Irwin et al., 2015). On the other hand, as an important subtopic in the domain of human sex/gender preferences, clarifying the issue of sex differences in trust levels holds significant meaning for both elucidating trust mechanisms and explaining the psychological characteristics of both sexes.

Do sex differences exist in trust levels? One group of researchers holds the view that sex differences in trust levels do exist, with risk preference theory being used to support the argument that men have higher trust levels (Croson & Gneezy, 2009), while women's advantages in the prosocial domain support the claim that women possess higher trust levels (Neufang et al., 2009). In contrast, another

group of researchers, based on the gender similarities hypothesis (Hyde, 2005), maintains that no sex differences exist in trust levels. This paper aims to review these two perspectives and clarify the issue of sex differences in trust levels. The following sections will first introduce the empirical and theoretical support for both viewpoints, then analyze and discuss the validity of these perspectives and their theoretical foundations based on current research developments, and finally propose directions for future research.

### 2.1.1 Empirical and Theoretical Support

Numerous scale-based studies (Irwin & Berigan, 2013; Zeffane, 2018) and experimental investigations (Buchan et al., 2008; Chaudhuri & Gangadharan, 2002; Dittrich, 2015; Derks et al., 2014; Garbarino & Slonim, 2009; Groep et al., 2020; Holden & Tiahum, 2018; Lemmers-Jansen et al., 2017; Macko, 2020; Romano et al., 2017; van den Akker et al., 2020; Wu et al., 2020) have found that men exhibit an advantage in trust levels. For example, Garbarino and Slonim's (2009) large-scale trust game survey revealed that men had significantly higher trust levels than women across all age groups, a finding that could not be explained by demographic variables such as education, income, race, or occupation.

Researchers have primarily interpreted this male advantage in trust levels through risk preference theory (Croson & Gneezy, 2009). Risk preference refers to an individual's psychological reactions, attitudinal tendencies, and investment willingness when facing risk during decision-making processes (Markowitz, 1952). From a traditional economic perspective, trust represents a risky decision made in vulnerable situations, and trust behavior in trust games approximates venture investment (Fehr, 2009). Numerous studies have demonstrated that trust is closely related to risk preference (Thielmann & Hilbig, 2015), and compared to women's risk-averse tendencies, men exhibit distinct risk preference characteristics (Chaudhuri & Gangadharan, 2002; Charness & Gneezy, 2012; Croson & Gneezy, 2009). For instance, Chaudhuri and Gangadharan (2002) found that, unlike men, women's level of risk aversion significantly predicted their investment amounts in trust games ( $\beta = 0.213$ ,  $p < 0.01$ ), leading them to speculate that women's risk-averse tendencies might inhibit their trust expression. Additionally, social role theory also explains the male advantage in trust levels from a risk preference perspective. Since men have historically occupied high-status, high-power social roles, they are often attributed with independent, confident, and ambitious characteristics (Eagly, 2009; Eagly & Wood, 1999; Zhao & Zhang, 2016). Consequently, men may exhibit typical "masculine" behaviors such as high risk preference and more aggressive actions based on social role expectations, which may lead them to express trust more frequently in vulnerable trust situations.

### 2.1.2 Analysis and Discussion

This review finds that the theoretical foundation for men's high trust tendency based on risk preference has received relatively sufficient support (Chaudhuri

& Gangadharan, 2002; Holden & Tilahun, 2018). For example, Holden and Tilahun's (2018) research demonstrated that after controlling for risk tolerance between sexes, the male advantage in trust levels was no longer significant. Relatedly, the facilitative effect of testosterone (a typical male hormone) on risk preference provides a physiological explanation for male trust advantage. Apicella et al. (2014) found that higher testosterone levels were associated with stronger tendencies toward risk-taking behavior and lower risk avoidance in risk-inducing tasks.

However, considering the close relationship between the trust game paradigm and risk preference (Thielmann & Hilbig, 2015), and given that the vast majority of studies using the trust game paradigm (rather than scale-based trust) support the view that men have an advantage in trust levels (Buchan et al., 2008; Chaudhuri & Gangadharan, 2002; Dittrich, 2015; Derks et al., 2014; Garbarino & Slonim, 2009; Groep et al., 2020; Holden & Tiahum, 2018; Lemmers-Jansen et al., 2017; Macko, 2020; Romano et al., 2017; Wu et al., 2020), these findings may indicate that the male advantage in trust levels is dependent on the characteristics of the trust game paradigm. Research has shown that risk preference may affect the internal validity of game paradigms through paradigm variations (e.g., investment multiplication rates), reducing their effectiveness in measuring trust (Gong et al., 2021). Some researchers have even questioned whether the trust game paradigm actually measures trust (Sapienza et al., 2013; Thielmann & Hilbig, 2015). Filippin and Crosetto (2016) noted that the return level in risk tasks (i.e., investment multiplication rate) is an important factor triggering sex differences. For example, Garbarino and Slonim (2009) found that women's expectations for investment returns in trust games were significantly lower than men's. When the maximum expected return reached \$30, significant sex differences in trust levels emerged, but when the maximum expected return was \$15, these differences disappeared. Since the trust game paradigm may be influenced by risk preference, interpretations of men's strong performance in trust games must fully assess potential confounds in trust measurement methods.

Furthermore, this review finds that most Western trust studies support the view that men have an advantage in trust levels (Buchan et al., 2008; Chaudhuri & Gangadharan, 2002; Dittrich, 2015; Derks et al., 2014; Garbarino & Slonim, 2009; Groep et al., 2020; Holden & Tiahum, 2018; Irwin & Berigan, 2013; Lemmers-Jansen et al., 2017; Macko, 2020; Romano et al., 2017; Wu et al., 2020; Zeffane, 2018), whereas this view has not been fully supported in Chinese studies (Liu et al., 2016; Li et al., 2016; Xin & Zhou, 2012), possibly due to differences in trust concepts between Eastern and Western cultures. Wang et al. (2016) summarized that in Western societies, personal characteristics such as the trustee's competence and sense of responsibility are more highly valued, whereas in China, people emphasize interpersonal relationship factors and value both innate and acquired connections (Wu & Huang, 2012; Yang & Peng, 1999). Therefore, current mainstream Western trust evaluation systems may not fully capture trust characteristics in Eastern cultural contexts. For instance, there may be differences in trust radius between East and West, leading to cultural variations in

how subjects interpret “most people” in scale-based trust studies. Specifically, collectivist cultures (e.g., China) may have a narrower trust radius compared to individualist cultures (e.g., the United States) (van Hoorn, 2015). Additionally, Zhao and Zhang’s (2016) research with Chinese subjects found that men’s trust levels were highest toward women and lowest toward men, whereas Western studies have found that men’s trust levels were highest toward men and lowest toward women (Rapoport & Chammah, 1965), with other research finding no significant effect of the trustee’s gender on trust levels (Buchan et al., 2008). These differences may be related to traditional Eastern cultural concepts emphasizing male dominance and female subordination (Zhao & Zhang, 2016).

### 2.2.1 Empirical and Theoretical Support

The advantage of women in trust levels has been demonstrated in a series of scale-based and experimental studies (Falk & Hermle, 2018; Furumo & Pearson, 2007; Rodrigo-González et al., 2019; van den Akker et al., 2020; Zeffane, 2020). For example, Falk and Hermle’s (2018) survey published in *Science*, which covered 76 countries and approximately 80,000 subjects, found that women had significantly higher trust levels than men. Rodrigo-González et al. (2019) used anonymous, randomized multi-round trust games and found that women generally exhibited higher trust levels.

Researchers typically explain this phenomenon from a prosocial perspective (Derks et al., 2014; Yamagishi et al., 2015). Prosocial orientation is a social value orientation where individuals simultaneously consider both self and others’ interests (Pletzer et al., 2018; Wei et al., 2021). Some researchers view trust as a moral and prosocial behavior. For instance, Uslaner (2002) proposed that trust is a moral obligation—a belief system that assumes others are trustworthy. Neuroscientific research has also revealed the close association between trust and prosocial behavior. Krueger et al. (2008) found that trust and reciprocity share similar neural mechanisms, both relying on mentalizing and empathy-related neural systems, specifically showing significant activation in the medial prefrontal cortex (mPFC), temporoparietal junction (TPJ), and anterior insula (AI). More importantly, numerous studies have shown that women exhibit higher prosocial levels than men (Falk & Hermle, 2018; Zheng et al., 2015) and demonstrate advantages in friendliness, affiliation, empathy, and emotional expression (Derks et al., 2014; Eagly, 2009; Eagly & Wood, 1999; Zhao & Zhang, 2016). Such traits may lead women to pay greater attention to interaction partners’ emotional experiences in social activities, thereby facilitating trust decisions from a prosocial intuition or moral obligation perspective. Physiological evidence provides indirect support for higher female trust levels (Kosfeld et al., 2005). Estrogen (a typical female hormone) is believed to promote oxytocin production (Choleris et al., 2008), and oxytocin, as the “trust hormone,” can significantly enhance individuals’ trust (Kosfeld et al., 2005), generosity (Barraza et al., 2011), cooperation (De Wilde et al., 2017), and other prosocial behaviors, suggesting that women’s advantages in this domain have

a corresponding biochemical basis. For example, De Wilde et al. (2017) found that oxytocin significantly increased individuals' decision-making tendencies to sacrifice personal gains for team benefits.

### 2.2.2 Analysis and Discussion

This review finds that evidence for women's high trust levels based on prosocial motivation remains insufficient. Derks et al.'s (2014) study of 206 adolescents found that although prosocial orientation significantly positively predicted trust levels, social value orientation (prosocial) and gender were actually two independent predictors of trust. Demographic data further showed that while women had higher prosocial levels, men's trust levels were more pronounced. Some studies have even indicated that men have advantages in both trust levels and prosocial tendencies (Kanagaretnam et al., 2009). Additionally, although research supports that women are more inclined to invest in unequal interactions (risky dictator game) (Hong & Bohnet, 2007), numerous trust game studies have shown that asymmetrical monetary holdings (unfair situations) do not significantly trigger female trust (Buchan et al., 2008; Dittrich, 2015). For instance, Brühlhart and Usunier's (2012) study demonstrated that the amount held by the trustee did not differentially affect investment behavior between sexes.

Although women's prosocial advantage in trust has been questioned, substantial evidence indicates that women not only prefer to establish trust from a relationship maintenance perspective but also possess greater ability to maintain trust relationships (Cox & Deck, 2006; Haselhuhn et al., 2015; Shao, 2019; Warner-Søderholm et al., 2018; Zinchenko et al., 2017). Rodrigo-González et al. (2019) argued that women's trust decisions focus more on the trustee's similarity characteristics. When homogeneity between trustee and trustor increases (e.g., when they are familiar with each other), women's risk perception levels may significantly decrease, thereby promoting their trust willingness. This aligns with Buchan et al.'s (2008) view that female trust has a communal orientation and is process-based, emphasizing procedural aspects. Research has found that women value not only the trustee's integrity, similarity, social distance, and perceived friendliness during interactions (Cox & Deck, 2006; Warner-Søderholm et al., 2018; Zinchenko et al., 2017) but also pay close attention to their own image in trust establishment and excel in trust dimensions closely related to communality (e.g., emotional trust) (Shao, 2019). Macko (2020) noted that when trust games employ a binary choice paradigm (invest all or invest nothing), women may be more inclined to choose investment because "not investing" could be perceived as hostile behavior. Trust research related to betrayal further supports women's communal orientation in trust. Wu et al.'s (2020) neuroimaging study found that in trust games, women's subgenual ACC (SgACC) activation gradually decreased as investment risk increased, suggesting women's high sensitivity to social risks such as betrayal in game interactions. More importantly, Haselhuhn et al.'s (2015) study showed that compared to men, women were better able to maintain trust toward betrayers after experiencing betrayal and demonstrated

faster trust repair speed, revealing the resilience of female trust in the repair and maintenance stages. Based on these findings, this paper speculates that: First, although communality and prosocial concepts are similar, they are not equivalent. The former emphasizes the importance and maintenance of interaction relationships (Buchan et al., 2008), while the latter focuses on protecting others' interests (Pletzer et al., 2018; Wei et al., 2021). Therefore, the communal characteristics of female trust may not necessarily lead women to demonstrate prosocial pathway advantages in trust measurement systems dominated by risk preference (trust games). Second, most sex difference studies in trust only represent the trust establishment stage and have not adequately addressed the dynamic process of trust development, which may prevent the full manifestation of women' s communal trust advantages. Third, sex differences in interaction often emerge in specific social contexts (Balliet et al., 2011; Croson & Gneezy, 2009) and are influenced by variables such as interaction partner characteristics that women particularly focus on (Rodrigo-González et al., 2019). However, current research in this field often neglects the moderating role of such contextual variables, which may also limit opportunities for women' s prosocial-level trust advantages to be demonstrated.

### 3.1 Empirical and Theoretical Support

Numerous studies have found no significant sex differences in trust levels (Hyde, 2005; Haselhuhn et al., 2015; Lemmers-Jansen et al., 2019; Li et al., 2019; Navarro-Carrillo et al., 2018; van den Bos et al., 2010; Xin & Zhou, 2012), providing support for the view that trust levels are similar between sexes. For example, Navarro-Carrillo et al.'s (2018) survey of 889 Spanish subjects found no significant sex differences in general trust, interpersonal trust, or depersonalized ingroup trust.

Researchers generally explain the phenomenon of similar trust levels between sexes based on the gender similarities hypothesis (Hyde, 2005). As early as 1914, Thorndike noted that compared to within-gender variation, psychological differences between sexes were minimal. The gender similarities hypothesis posits that effect sizes for sex differences in most psychological variables range from small ( $0.11 < d < 0.35$ ) to near zero ( $d < 0.10$ ), with only a few reaching medium ( $0.36 < d < 0.65$ ), large ( $0.66 < d < 1$ ), or very large ( $d > 1$ ) levels (Hyde, 2005). Hyde (2005) explicitly proposed that both sexes are similar in most psychological variables and do not differ fundamentally. Meta-analytic research indicated that approximately 78% of variable differences (covering 124 variables in the study) between sexes were small to near zero, with trust showing a small sex difference effect size ( $d = -0.35$ ), while variables with larger effect sizes concentrated in domains related to sexuality, athletics, and aggression (Hyde, 2005). According to classic social role theory, sexes exhibit specific interpersonal interaction patterns due to differences in social networks and social capital (Eagly & Wood, 1999). However, with socioeconomic development, differences in social resources between sexes have gradually disappeared, and

traditional gender roles have increasingly disintegrated, which may bridge trust level differences between sexes. Falk and Hermle (2018) inferred accordingly that the behaviors and beliefs of both sexes should become more assimilated in contemporary society. Xin and Zhou's (2012) study confirmed this view through a meta-analysis of Chinese trust research from 1998 to 2009, finding no significant sex differences in trust levels among Chinese university students, with trust levels between sexes showing a converging trend over time.

### 3.2 Analysis and Discussion

Although substantial experimental evidence indicates similar trust levels between sexes, this conclusion relies on non-significant research results, making the inference of similar trust levels somewhat risky. It is possible that measurement methods, statistical techniques, and sample limitations may have prevented sex differences from fully emerging, thereby indirectly supporting the view of similar trust levels. For example, Haselhuhn et al. (2015) found similar trust levels between sexes using a binary trust game paradigm and discovered that women had faster trust repair speeds. In contrast, Macko (2020), using the classic trust game paradigm, obtained completely different results, finding that men not only had higher trust levels but also faster trust repair speeds. Given that adjustments to the trust game paradigm may be influenced by risk preference and social preferences (e.g., binary vs. non-binary) (Gong et al., 2021), the discrepancy between Haselhuhn et al.'s (2015) and Macko's (2020) results may actually be related to paradigm variations. Evidence suggests that unlike non-binary trust games where men show clear advantages, most binary trust games show no significant sex differences (Binzel & Fehr, 2013; Haselhuhn et al., 2015; Kiyonari et al., 2006; van den Bos et al., 2010). Therefore, whether results such as Haselhuhn et al.'s (2015) truly support the view of similar trust levels or are merely consequences of trust paradigm application remains questionable.

This paper argues that limitations in trust measurement paradigms themselves may be an important reason why sex differences in trust have not been captured. On one hand, the trust game paradigm cannot adequately represent multidimensional trust. Trust can be divided into ability trust, integrity trust, and benevolence trust based on trustee characteristics (Mayer et al., 1995). Some argue that trust behavior in trust games is primarily based on the benevolence dimension and rarely involves ability and integrity dimensions (Levine & Schweitzer, 2015). Therefore, the single-dimensional examination in trust games may fail to reveal sex differences across multiple trust dimensions. On the other hand, scale-based trust lacks ecological validity. Trust scales mostly rely on self-report assessments based on vague scenarios, representing individuals' non-contextualized trust attitudes. However, in real life, trust is a highly structured and contextualized behavior. Because scale-based trust cannot reflect the complex process of trust decision-making, sex differences in trust may not be fully expressed.

Furthermore, the reliability of the gender similarities hypothesis requires further examination. A series of studies have shown that sex differences in preferences

are positively correlated with socioeconomic development and gender equality levels. Rather than bridging sex differences, developing socioeconomic conditions may actually facilitate the expression of more traditional role orientations (Falk & Hermle, 2018; Giolla & Kajonius, 2019; Schmitt et al., 2017). For example, in countries with greater gender equality, women exhibit higher levels of traditionally feminine characteristics such as being worried, social, inquisitive, caring, and responsible (Giolla & Kajonius, 2019). Additionally, several psychological traits (Dark Triad, self-esteem, subjective well-being, depression levels, values, etc.) show greater differences between sexes in regions with more equal gender roles, more complete gender socialization, and greater sociopolitical gender equity (Schmitt et al., 2017). Socioeconomic development may not only meet human survival needs but also create conditions for sex differences to manifest (Falk & Hermle, 2018).

#### 4.1 Rational Application of Trust Measurement Methods

Trust games and scale-based trust, as mainstream trust measurement methods, have produced divergent results in sex difference research. Unlike trust games, which largely support the view that men have an advantage in trust levels, scale-based trust studies have provided some support for all three major perspectives: male advantage (Irwin & Berigan, 2013; Zeffane, 2018), female advantage (Falk & Hermle, 2018; Zeffane, 2020), and similar levels between sexes (Navarro-Carrillo et al., 2018). These differences may be related to research paradigm applications and pose certain challenges for clarifying sex differences in trust.

Regarding trust games, as an indirect measurement method that uses investment levels to represent trust, using “investment behavior” as a proxy for trust may introduce confounding variables that negatively impact internal validity. For example, van den Akker et al. (2020) proposed the “male multiplier effect,” whereby when game paradigms include multiplied returns, men invest more than women both as initiators (investors in trust games) and as responders (investees), indicating that men’s investment tendencies are closely influenced by risk preference factors embedded in research paradigms. Therefore, future research should comprehensively employ multiple methods to further verify the scientific validity of trust game paradigm variations and attempt to 剥离 the interference of “investment scenarios” from trust paradigms. Specifically, researchers should focus on determining the extent to which men’s advantage in trust games is based on “trust” versus “risk preference.” On one hand, researchers could actively measure risk preference and other variables in trust game studies to examine the relationship between investment levels and risk preference across sexes. On the other hand, qualitative research methods could be used to explore sex differences in cognition, attitudes, and emotions within trust games.

Regarding scale-based trust, the relatively specific manifestations of sex differences in trust games versus scale-based trust may be attributed to three reasons. First, scale-based trust uses subjective reporting to represent individual trust

propensity without involving the venture investment scenario of trust games. Thus, scale-based trust may circumvent the potential problem of men obtaining high trust scores due to trust game paradigm characteristics. Second, compared to trust games, scale-based trust covers more comprehensive trust types and may more fully reflect sex similarities and differences across multiple trust dimensions. Third, trust games represent an indirect measurement paradigm for trust, whereas scale-based trust is a direct representation method (Bauer & Freitag, 2018). Some perspectives suggest that trust games and scale-based trust represent behavioral and trait systems of trust, respectively (Gong et al., 2021). Therefore, current research results may reveal that men are stronger in indirect trust measurement systems and trust behavior, while this advantage is not significant in direct trust trait assessment systems.

In summary, this paper argues that future research should more rationally apply trust measurement methods. On one hand, attempts should be made to 剥离 interference caused by investment scenarios in trust game paradigms. On the other hand, multiple measurement methods should be used concurrently to represent multidimensional trust (e.g., combining trust games with scale-based trust). By horizontally comparing results across different studies and measurement methods, more precise capture of specific characteristics of sex differences in trust behavior can be achieved, helping to truly clarify these differences.

#### 4.2 Clarifying Gender Characteristics in Dynamic Trust Processes

Current research generally employs relatively static and one-sided understanding and operationalization of trust variables, inadequately addressing the dynamic psychological processes of trust development. This paper argues that trust dynamism is manifested in at least three aspects. First, from the perspective of trust mechanisms, trust has dynamic mechanisms at both individual and interpersonal levels. Second, from a developmental psychology perspective, the lifelong developmental trajectory of trust exhibits sex differences. Third, from a cross-cultural perspective, trust dynamism also reflects differential influences of different cultural backgrounds on trust.

From the perspective of trust mechanisms, trust as a dynamic psychological process can be divided into establishment and development, betrayal and maintenance components (Zhang et al., 2011). Previous research has mostly focused on trust establishment while giving insufficient attention to trust development, betrayal, and maintenance. Preliminary studies have shown significant sex differences in trust maintenance and repair after experiencing betrayal (Haselhuhn et al., 2015; Macko, 2020).

From a developmental psychology perspective, the individual developmental process of trust is not static. Research has shown that trust is significantly positively correlated with age (Castle et al., 2012; Li & Fung, 2013). However, some researchers argue that the relationship between trust and age is not simply linear. For example, Sutter and Kocher (2007) found that trust levels increased

almost linearly from early childhood to early adulthood but stabilized in middle and late adulthood. Other researchers have proposed a weak but significant negative correlation between trust levels and adolescence (Derks et al., 2014). However, current research on sex differences in trust levels has not adequately examined the influence of age factors. Preliminary studies have indicated that men's trust levels show an inverted U-shaped change with age development, while women's trust levels show no significant correlation with age (Dittrich, 2015).

From a cross-cultural perspective, different cultural backgrounds may differentially influence trust. Culture is an important factor affecting individual cognition and behavior, and interpersonal trust generation depends on specific cultural backgrounds and social structures (Wang et al., 2016). Researchers have noted that collectivist and individualist cultural backgrounds confer different trust expressions between East and West (Wu & Huang, 2012; Wang et al., 2016; Yang & Peng, 1999). East-West trust differences may manifest at both the trust level and trust dimension levels. At the trust level, traditional Eastern culture may shape lower trust levels. For example, Yamagishi and Yamagishi (1994) found that Japanese society's emphasis on interpersonal relationship networks resulted in significantly lower national trust levels compared to the United States. At the trust dimension level, Eastern culture may shape relationship-oriented trust characteristics. Hu's (2007) research showed that Taiwanese managers trusted employees with closer relationships more, whereas American managers trusted more competent employees more. However, current research cannot yet answer whether different cultural backgrounds differentially affect sex differences in trust levels and characteristics.

Therefore, future research should examine sex differences in trust across different cultural systems from a culture-gender interaction perspective.

### **4.3 Deepening Neurophysiological Mechanism Research on Sex Differences in Trust**

Behavioral experiments have preliminarily explored sex differences in trust, but the neural mechanisms underlying trust remain unclear (Wu et al., 2020). Researchers cannot fully clarify the internal mechanisms and developmental processes of sex differences in trust levels based solely on behavioral or trait-level data. Therefore, deepening neurophysiological research on sex differences in trust is crucial for fundamentally revealing these differences.

Lemmers-Jansen et al.'s (2016, 2019) series of studies found sex differences in brain region activation during trust investment in reciprocal situations, but no significant differences in brain mechanisms during betrayal situations. However, the two studies found inconsistent sex differences in trust levels (the former showing significant differences in baseline and betrayal situations, the latter showing no significant differences in any situation), making it difficult to fully explain the cognitive neural mechanisms and brain functional localization of sex

differences in trust levels. Additionally, although Wu et al. (2020) found that men exhibited higher trust levels than women in trust games and showed significant activation in brain regions related to cognitive control and self-referencing, given the limited number of studies in this field and potential flaws in the trust game paradigm, brain mechanism research on sex differences in trust requires further investigation. Generally, key brain regions for trust are located in the medial prefrontal cortex, caudate nucleus, amygdala, and insula (Zhang et al., 2016). Future research could comprehensively employ ERP and fMRI technologies to systematically examine the brain mechanisms underlying sex similarities and differences in trust levels, focusing on these key brain regions. For example, investigating whether sexes have specialized trust neural pathways in various trust situations (e.g., men 偏向 risk preference, women 偏向 prosocial) could provide better explanation and supplementation for current research.

Researchers could also explore the mechanisms of sex differences in trust levels from a physiological hormone perspective. Existing research shows that sex hormones are closely related to individual social cognition and social behavior. For example, studies have found that estradiol and progesterone significantly promote women's perception of threat information (Conway et al., 2007), while testosterone has complex effects on individual empathy (Heany et al., 2020). Therefore, differential baseline levels of sex hormones may be one important source of different trust characteristics between sexes. For typical trust-related hormones such as oxytocin, future research should examine them from a sex interaction perspective. Considering that women's menstrual cycles may affect oxytocin efficacy, most current research has made inferences based on male subjects (Yue et al., 2017). However, Yue et al. (2017) noted that for men, oxytocin increases competitiveness and sensitivity to reward stimuli, whereas for women, oxytocin enhances perception of positive emotional information, leading to stronger cooperation and altruism, and may also inhibit activation of women's reward systems. Therefore, physiological hormones may exert non-general effects on trust, and their differential effects on sexes are also related to other factors that require clarification in future research.

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