

Gender Differences in Personality and Social Behavior

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Abstract

The scientific study of gender differences has yielded a wealth of robust generalizations about the way males and females differ across domains, cultures, and developmental stages. This article provides a descriptive overview of gender differences in personality, social cooperation and competition (including aggression and play), and verbal and nonverbal communication. Qualitative statements about the typical behavior of males and females are supplemented with quantitative data from *meta-analyses* and other large-scale studies. Key methodological issues in the measurement of gender differences are discussed to aid the reader in the interpretation of research findings.

The scientific study of gender differences has a long history, spanning more than a century of research (Ellis et al., 2008). Competing theories of gender vary in the role they assign to evolutionary history, cultural practices, endocrine and neurobiological mechanisms, and individual learning; they also vary in the extent to which they regard these levels of explanation as complementary or mutually exclusive. While the field is rife with theoretical debate and controversy, decades of empirical research have yielded a wealth of robust generalizations about the way males and females differ across domains, cultures, and developmental stages. This process has been accelerated by the diffusion of *meta-analytic* techniques over the last 30 years. Thanks to *meta-analysis*, the results of multiple studies can be aggregated and corrected for various sources of error; also, the effects of potential moderators can be analyzed in detail.

This article provides a descriptive overview of gender differences in personality; social cooperation and competition (including aggression and play); and verbal and nonverbal communication. Whenever possible, qualitative statements about the typical behavior of males and females are supplemented with quantitative data from *meta-analyses* and other large-scale studies. To aid the reader in the interpretation of these findings, the initial section presents and discusses key methodological issues in the measurement of gender differences.

Methodological Issues

The Interpretation of Effect Sizes

In psychological research, group differences (including differences between males and females) are usually expressed in terms of standardized effect sizes. The most common effect size for group and gender differences is Cohen's d , the difference between means divided by the pooled standard deviation of the two groups (e.g., $d = 0.50$ represents a distance of half a standard deviation between male and female means). Conventionally, positive values of d indicate that the male mean is higher than the female mean, whereas negative values indicate that the female mean is higher. Values of d can easily be translated into estimates of statistical overlap (Figure 1). For example, $d = 0.50$ corresponds to a 67% overlap between male

and female distributions (assuming normality). The precision with which a variable is measured can dramatically affect the resulting effect size, since d becomes artificially smaller as measurement error increases. Many psychological variables are measured with a substantial margin of error; thus, empirical values of d should be interpreted as lower bound estimates of the actual differences. Effect sizes that have been corrected for measurement error are explicitly flagged as such in the remainder of this article.

Regrettably, many researchers routinely interpret effect sizes as 'small,' 'moderate,' or 'large' based on the conventional cutoffs ($d = 0.20, 0.50, \text{ and } 0.80$) originally proposed by Cohen (1988). This practice has little basis in statistical theory and is discouraged by most methodologists (Breugh, 2003; Hedges, 2008; Vacha-Haase and Thompson, 2004). Ironically, Cohen himself advised against using his tentative cutoffs except as a last resort method for determining sample size in exploratory studies (Cohen, 1988). The substantive

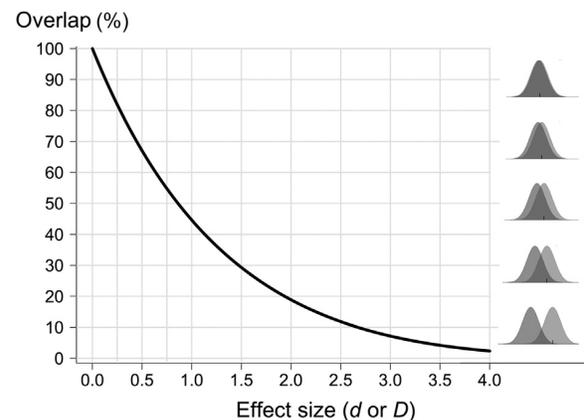


Figure 1 Relation between effect size (d or D) and percent overlap between male and female distributions. The illustrative plots on the right show two univariate distributions overlapping by 10%, 30%, 50%, 70%, and 90% of their joint area. Overlap is computed assuming multivariate normality. See Del Giudice, M., 2009. On the real magnitude of psychological sex differences. *Evolutionary Psychology* 7, 264–279.

interpretation of an effect size may vary dramatically depending on measurement issues, theoretical considerations, and the scientific question being asked. For example, differences between group means have a progressively larger impact as one moves toward the distribution tails. Even when male and female distributions are largely overlapping in the region surrounding the mean of a trait, individuals with *extreme* values of the same trait may still be predominantly male or female. In the light of these considerations, debating whether males and females are 'more similar' or 'more different' based on a rigid interpretation of effect sizes (e.g., Hyde, 2005, 2013) is unlikely to prove a fruitful strategy for understanding the meaning of gender differences and their societal implications.

Univariate versus Multivariate Differences

The standard approach to gender differences in psychology is to measure groups of males and females on multiple variables – for example physical, verbal, and relational aggression – and compute an effect size for each individual variable. This approach becomes problematic in dealing with intrinsically multidimensional domains such as personality and aggression. To begin with, small differences in multiple traits can add up to a much larger effect if the traits are considered simultaneously. For example, facial features – nose length, eye size, face width, and so forth – show considerable overlap between genders when they are considered one by one. However, their *combined* effect results in nearly complete separation between male and female faces, and indeed, human observers can classify faces by gender with more than 95% accuracy (see Del Giudice, 2013). Another limitation of univariate effect sizes (such as d) is that they cannot take into account the patterns of *correlation* between the variables that constitute a given psychological domain.

The limitations of univariate effect sizes can be overcome by supplementing them with multivariate effect sizes that simultaneously consider multiple variables and their correlational structure. The natural extension of Cohen's d is the Mahalanobis D , a standardized difference between two groups in multivariate space. When employed to measure gender differences, D can be interpreted as the distance between group means on an abstract dimension of *masculinity–femininity* in the relevant domain. The interpretation of D in terms of distribution overlap is exactly the same as that of d (Figure 1). Unlike d , D is always positive since the concept of a higher or lower mean is meaningless in multidimensional space (Del Giudice, 2009). The application of multivariate effect sizes to gender differences has been debated by some authors (e.g., Hyde, 2013); however, the arguments leveled against D turn out to be either incorrect or logically inconsistent (Del Giudice, in press). In this article, both univariate and multivariate effect sizes are reported whenever the latter are available.

Dimensional versus Taxonic Differences

Finding evidence that, on average, males and females differ on a certain set of variables does not tell the whole story about the nature of gender differences in that domain. Another important question is whether gender differences are differences in *degree* – with males and females varying along a single

continuum – or differences in *kind*, implying a clear-cut discontinuity in the distribution of variables between groups. This question is conceptually independent from questions about the *size* of those differences.

Taxometrics is a set of statistical methods that attempt to determine whether a certain group is a *taxon*, i.e., a clearly demarcated category that differs in kind and not just in degree from another group. In a recent paper, Carothers and Reis (2013) employed taxometrics to determine whether binary gender categories can be regarded as dimensional or taxonic in a number of domains including personality, social behavior, and sexuality. The results overwhelmingly supported a dimensional model of gender, with the exception of *sociosexuality* (the preference for promiscuous, uncommitted sex versus monogamous, committed partnerships). However, these pioneering findings must be taken with caution, since taxometric methods are unlikely to detect an existing taxonic structure if the mean difference between groups is smaller than about $d = 1.20$ (Beauchaine, 2007). Since the size of gender differences in many psychological traits falls below this threshold (see below), taxometric results are difficult to interpret with any confidence.

Gender Differences in Trait Variability

Males and females may differ not just in the mean value of a trait or behavior, but also in their *variability* around the mean. When such differences are found, the general tendency is for males to display more variability than females (Archer and Mehdikhani, 2003; Hyde, 2013). The more variable gender will tend to be overrepresented at both tails of the distribution, even if mean differences are small or absent (see Voracek et al., 2013). The standard metric for gender differences in variability is the variance ratio (VR), the ratio of male variance to female variance. $VR = 1$ indicates equality of variances, $VR > 1$ indicates higher variability in males, and $VR < 1$ indicates higher variability in females.

Gender Differences in Personality

Descriptive models of personality have a hierarchical structure, from broad and inclusive traits to narrow and specific ones. Typically, 3–6 broad traits ('domains' or 'global traits') are subdivided into 10–20 narrower traits ('aspects' or 'specific factors'); at the lowest level of description, dozens of specific personality 'facets' (usually 30–45) can be identified. Patterns of gender differences are already apparent at the level of broad traits, but become stronger and more recognizable at a finer-grained level of analysis.

Broad Personality Traits

Big Five Domains

The most widely adopted model of personality is the Five Factor Model (FFM), whose five domains are known as the Big Five: *neuroticism* (negative emotionality and emotional instability), *agreeableness* (altruism and cooperation), *conscientiousness* (self-control, self-discipline, and organization), *extraversion* (sociability, assertiveness, and positive emotionality), and *openness* (imagination, intellectual curiosity, and aesthetic appreciation). Across countries, gender differences in the Big

Five are largest in agreeableness ($d = -0.40$) and neuroticism ($d = -0.34$); females consistently score higher than males on both traits. Smaller differences favoring females are found in conscientiousness ($d = -0.09$) and extraversion ($d = -0.11$); finally, there are no reliable differences in openness ($d = 0.01$). There is some cross-cultural variability around these averages; as a rule, gender differences tend to be larger in individualistic, gender-egalitarian societies (Feingold, 1994; Lippa, 2010; Schmitt et al., 2008). In a reanalysis of a large US data set, Del Giudice (2009) found a multivariate difference of $D = 0.98$ (corrected) for the Big Five domains, corresponding to a 45% overlap between male and female distributions.

A recent study of variation in Big Five domains (Borkenau et al., 2013) found equal variance between genders in self-reported traits ($VR \approx 1$), but higher male variance in informant-reported traits ($VR \approx 1.20$). Neuroticism was an exception: males showed lower variability in self-reports ($VR = 0.89$) and equal variability in informant-reports ($VR = 1.01$). Given the comparatively small size of the study, these findings should be regarded as preliminary.

The Interpersonal Circumplex

In the interpersonal circumplex model (IPC), individual differences in personality are mapped on two independent axes of variation, *dominance* (assured-dominant versus insecure-submissive) and *nurturance* (warm-agreeable versus cold-hearted). The IPC can be regarded as an alternative representation of the extraversion and agreeableness domains of the FFM (DeYoung et al., 2013). The interpersonal dimensions of the IPC bring into sharp relief a pattern of gender differences that is partially masked by the structure of Big Five domains: on the traits that best correspond to those dimensions, males consistently score higher in dominance ($d \approx 0.20$ – 0.50) and lower in nurturance ($d \approx -0.25$ to -1.00 ; Costa et al., 2001; Del Giudice et al., 2012; Feingold, 1994). Based on data for dominance and warmth reported in Del Giudice et al. (2012), the multivariate effect size for the IPC can be estimated at $D = 1.14$ (corrected).

Temperament

In infants and children, individual differences in behavior are usually framed as 'temperament' rather than 'personality'; standard dimensions of temperament overlap only partially with adult personality traits. In a meta-analysis of temperament ratings from 3 months to 13 years of age, Else-Quest et al. (2006) found that females scored higher in all dimensions of *effortful control* (self-control and delay of gratification; $d = -0.05$ to -1.01), whereas males tended to score higher in dimensions of *surgency* (activity and sociability; $d = -0.11$ to 0.55). No reliable gender differences were observed in *negative affectivity* ($d = -0.17$ to 0.13), a surprising finding when contrasted with the robust gender differences in adult neuroticism. The mean variance ratios were $VR = 1.08$ for dimensions of effortful control, $VR = 1.03$ for dimensions of surgency, and $VR = 0.98$ for dimensions of negative affectivity.

Narrow Personality Traits

While broad traits such as the Big Five provide a compact description of individual differences, they are not necessarily

the best level of analysis to investigate gender differences in personality. In many cases, the structure of broad traits masks the existence of larger gender differences at the level of narrower traits. For example, comparatively small differences in extraversion actually result from the combination of larger, opposite-sign differences in assertiveness–sensation seeking (higher in males) and sociability–gregariousness (higher in females). Weisberg et al. (2011) examined the 10 aspects of the Big Five and detected contrasting patterns of gender differences within extraversion ($d = -0.23$ for enthusiasm, $d = 0.09$ for assertiveness), conscientiousness ($d = -0.18$ for orderliness, $d = 0.06$ for industriousness), and openness ($d = -0.27$ for aesthetic openness, $d = 0.22$ for intellect). At the level of 30 personality facets, the meta-analysis by Costa et al. (2001) found differences of $d = -0.09$ to -0.44 for neuroticism facets, $d = -0.33$ to 0.38 for extraversion facets, $d = -0.35$ to 0.32 for openness facets, $d = -0.17$ to -0.43 for agreeableness facets, and $d = -0.13$ to 0.20 for conscientiousness facets.

The 15 primary factors (PF) of the 16 PF model are narrow personality traits roughly comparable to Big Five aspects. In a large US sample, Del Giudice et al. (2012) found differences ranging from $d = -2.29$ to 0.54 (corrected). The largest differences were in *sensitivity* (aesthetic, intuitive, and tender-minded versus utilitarian, objective, and tough-minded; $d = -2.29$), *warmth* ($d = -0.89$), *apprehension* (worried, insecure, and self-doubting versus secure and self-assured; $d = -0.60$), *dominance* ($d = 0.54$), and *emotional stability* ($d = 0.53$). The multivariate effect size for the 15 factors was $D = 2.71$ (corrected), corresponding to a 10% overlap between male and female distributions (Del Giudice et al., 2012).

Impulsivity, Risk-Taking, and Sensation Seeking

Impulsivity, risk-taking, and sensation seeking are a group of correlated traits that deserve special consideration in virtue of their social and clinical implications. In a meta-analysis of risk-taking that employed a broad definition of the term and a wide range of indicators – including for example 'smoking' and 'guessing' – Byrnes et al. (1999) found that overall levels of risk-taking were higher in males ($d = 0.13$). Cross et al. (2011) employed a narrower definition of risk-taking and found even stronger gender differences ($d = 0.37$ across methods). In the same meta-analysis, males also showed higher levels of sensation seeking ($d = 0.22$). Gender differences in impulsivity were considerably smaller ($d = 0.08$). This finding can be contrasted with the robust gender differences in effortful control (the reverse of impulsivity) found in studies of infant and child temperament. Males displayed more variability in risk-taking ($VR = 1.10$) and sensation seeking ($VR = 1.08$), but not in impulsivity ($VR = 1.00$). Gender differences in risk-taking are not limited to stable dispositions, but extend to the role of contextual factors in determining moment-to-moment attitudes toward risk. For example, several studies have shown that acute stress tends to increase risk-taking in males, but decrease it in females (Mather and Lighthall, 2012).

Summary

The typical personality profiles of males and females differ in a number of ways. On average, males are more dominant,

assertive, risk-prone, tough-minded, cold-hearted, emotionally stable, utilitarian, and open to abstract ideas. Females are more nurturant, warm, altruistic, submissive, risk-averse, tender-minded, emotionally unstable, and open to feelings and aesthetic experiences. These differences tend to be larger in more gender-egalitarian countries, and together define a global dimension of personality masculinity–femininity. The global overlap between adult men and women in the distribution of personality traits can be estimated at about 10% – close to that between male and female facial features (Del Giudice, 2013). In addition, men are somewhat more variable in most (but not all) dimensions of personality. Gender differences in temperament are already apparent in infancy and childhood, but correspond only in part to those in adult personality. In particular, early differences in impulsivity seem to dissipate in adults, while differences in negative emotionality emerge during development.

Gender Differences in Cooperation and Competition

Cooperation and competition are the basic polarities of social life; their constant interplay provides the background for the rich tapestry of human relationships. From childhood to adulthood, cooperation and competition outside the family occur with particular frequency and intensity between same-gender individuals (Benenson, 2013; Geary, 2010; Geary et al., 2003). Both one's closest friends and allies and one's fiercest adversaries are likely to be other individuals of the same gender. The dynamics of same-gender relations are an essential aspect of human social behavior, and tend to carry over into mixed-gender interactions.

Cooperation and Competition in Males

While both genders participate in many kinds of social interactions, ranging from dyadic friendships to large groups, large-scale cooperation is a distinctive attribute of male sociality across the life span. Males are more likely to engage in cooperative group activities, form larger groups than females, and engage in frequent and intense between-group competition against other male groups. Male groups are characterized by stable internal hierarchies of status and dominance; within groups, competition tends to be individualistic or one-on-one (Benenson, 2013; Geary, 2010; Geary et al., 2003). A meta-analysis of cooperation in experimental games played between strangers (Balliet et al., 2011) showed that male–male interactions tend to be more cooperative than female–female interactions ($d = 0.16$). At the same time, males tend to show less altruistic and prosocial behavior across a range of domains, from sharing possessions to organ donations (Ellis et al., 2008). This is consistent with males' lower levels of agreeableness and nurturance (see above); the main exception to this pattern is 'heroic' helping behavior, especially when directed toward women (Eagly and Crowley, 1986). In group settings – including mixed gender groups – males display higher levels of task-oriented behavior and lower levels of social-emotional behavior ($d = 0.59$ and -0.59 in the meta-analysis by Carli, 1982).

Cooperation and Competition in Females

The dynamics of cooperation and competition in females are more complex and nuanced than their male counterparts. Female friendship tends to be more complex and less focused on shared activities than male friendships. Starting from middle childhood, females are more likely to form dyadic relationships characterized by high levels of intimacy, emotional support, exclusivity, and reciprocity. In turn, dyads are embedded in larger social networks in which hierarchies tend to be more fluid than those of male groups (Ellis et al., 2008; Geary, 2010; Geary et al., 2003). Peer relations in females are strongly influenced by norms of caring and equality. Superiority and overt competition are discouraged, and – unlike in male groups – high-status peers are often the target of dislike and denigration. Accordingly, female competition is often indirect and balanced by egalitarian concerns; displays of overt competitiveness are usually restricted to high-status females (Benenson, 2013). In group settings, females display higher levels of social emotional behavior focused on maintaining and managing personal relationships ($d = -0.59$ in Carli, 1982). This pattern is consistent with females' higher levels of agreeableness and nurturance and lower levels of dominance and assertiveness (see above). A prominent feature of female social relationships is social exclusion, an indirect aggression tactic in which a target individual is ostracized by the others. Both threats of social exclusion and actual episodes of ostracism are more common in female groups, especially in childhood and adolescence (Benenson, 2013).

Aggression

The existence of gender differences in aggression is one of oldest and most robust findings in this area. In psychology, the standard distinction is that between *physical*, *verbal*, and *indirect* (or *relational*) forms of aggression. Indirect aggression is used to damage another individual's social standing by ostracizing, gossiping, spreading malicious rumors, and so forth. In a comprehensive meta-analysis, Archer (2009) found that, across age groups, males engage in more direct aggression, both physical ($d = 0.58$) and verbal ($d = 0.29$), while females tend to engage in more indirect aggression ($d = -0.16$). A meta-analysis of studies of children and adolescents (Card et al., 2008) showed similar results for physical and verbal aggression ($d = 0.73$ and 0.38 , respectively), and a smaller effect for indirect aggression ($d = -0.06$). Gender differences in aggression – especially physical aggression – peak between adolescence and young adulthood (Archer, 2009). Overall, the multivariate effect size for male versus female patterns of aggression can be estimated at about $D = 0.89$ – 1.01 (corrected; Del Giudice, 2009).

While males and females tend to display similar levels of indirect aggression (especially compared with the much larger difference in physical aggression), the finer-grained dynamics of aggressive behavior differ between male and female groups. In particular, attractive females are the target of more indirect aggression by other females, whereas attractive males tend to receive less indirect aggression from their peers

(Vaillancourt, 2013). Also, experimental studies show that males tend to engage in *unprovoked* aggression more frequently than females ($d = 0.33$; Bettencourt and Miller, 1996).

Social Play

Social play is a universal feature of human development, and – like many other social activities – involves a complex balance of cooperation and competition. Gender differences in social play can be summarized as follows. Across cultures, girls engage more frequently in cooperative, nonaggressive social play, whereas boys show a higher frequency of play fighting and ‘rough-and-tumble’ play (about 3–6 times as much as girls; Geary, 2010), as well as higher levels of between-group competition. Both genders engage in sociodramatic play, in which social episodes are enacted based on everyday or fantastic themes. However, boys’ themes more frequently involve power, dominance, and aggression, whereas girls’ themes tend to involve interpersonal and family relationships (including play parenting). Gender differences in play behavior peak in middle childhood, around 8–10 years of age (Ellis et al., 2008; Geary, 2010).

Summary

Males tend to form larger, activity-oriented, competitive groups in which hierarchies tend to be stable and individual relationships require comparatively little emotional investment. Competition often involves direct forms of aggression. Intimate, high-intensity dyadic relationships play a bigger role in female social networks. Female groups are more emotion-focused and are characterized by unstable hierarchies and strong egalitarian norms; competition is often indirect and less openly confrontational. Aggression shows robust patterns of gender differences. Direct aggression – especially physical aggression – is higher in males; indirect forms of aggression are higher in females, though the size of the effect is considerably smaller. Gender differences in play behavior peak in middle childhood and mirror the broader pattern of gendered social dynamics: males engage in more play fighting and between-group competition, while females engage in more cooperative play centered around relational themes.

Gender Differences in Communication

Social behavior would be all but impossible without communication. In humans, the interplay between language and nonverbal behavior forms the background for an exceedingly complex communication system. Research on gender differences in linguistic communication has focused mainly on verbal ability (e.g., vocabulary, reading ability), language use (e.g., assertive communication), and conversational style (e.g., interruptions). Gender differences in nonverbal communication have been extensively studied, and include both the production of nonverbal displays – such as gestures and facial expressions – and the ability to accurately decode other people’s nonverbal behavior.

Verbal Ability

In a classic meta-analysis, Hyde and Linn (1988) found a female advantage in general verbal ability ($d = -0.20$). Specific abilities showed a more nuanced pattern of results: females performed better on measures of speech production ($d = -0.33$) and anagram solving ($d = -0.22$); smaller differences were found in writing and reading ($d = -0.09$ and -0.03 , respectively), while males showed an advantage in verbal analogies ($d = 0.16$). No reliable gender differences were detected in vocabulary skills ($d = -0.02$). The size of gender differences was largely independent of age, and showed no clear developmental trend from childhood to adulthood.

Language Use and Conversational Style

Given the robust gender differences observed in dominance- and nurturance-related dimensions of personality (see above), it is reasonable to expect males and females to differ in their typical patterns of language use and conversational style. Indeed, *meta-analytic* data in both children and adults show that, averaging across contexts, males tend to use more assertive speech ($d \approx 0.10$) whereas females tend to use more affiliative speech ($d \approx -0.10$). In addition, girls are more talkative than boys ($d = -0.11$), but the difference is reversed in adults ($d = 0.14$; Leaper and Ayres, 2007; Leaper and Smith, 2004). A related finding (Leaper and Robnett, 2011) is that females use more tentative speech, including more tag questions, e.g., “isn’t it?” ($d = -0.23$) and hedges, e.g., “I think” ($d = -0.15$). A conspicuous aspect of gender differences in language use is their strong dependence on contextual factors such as group size, age and gender of conversation partners, and familiarity. Depending on the specifics of the conversational setting, these differences can easily increase, decrease, or even change sign (Leaper and Ayres, 2007; Leaper and Smith, 2004). On average, males interrupt their conversation partners more than females do ($d = 0.15$); gender differences are especially large in the use of *intrusive* interruptions ($d = 0.33$), which can be unambiguously interpreted as a form of dominant behavior (Anderson and Leaper, 1998).

Nonverbal Communication

Nonverbal Behavior

A consistent finding in nonverbal behavior research is that females are generally more expressive than males. A *meta-analysis* by Hall (1984) found an overall effect size $d = -1.01$ for facial expressiveness and $d = -0.58$ for bodily expressiveness, even if males tend to adopt more expansive, open postures ($d = 1.04$). Females are also better at deliberately expressing emotions ($d = -0.52$). Gender differences in expressiveness show a clear developmental trend from childhood to adulthood (Chaplin and Aldao, 2013). In children, a smaller female advantage is found on positive emotions ($d \approx -0.08$) and *internalizing* negative emotions such as sadness and anxiety ($d \approx -0.10$); at the same time, boys tend to be more expressive on *externalizing* negative emotions such as anger ($d \approx 0.09$). By adolescence, however, females become more expressive across the board

and effect sizes increase ($d \approx -0.35$ for negative emotions and -0.28 for positive emotions).

Smiling and crying are two prototypical manifestations of expressive behavior. A *meta-analysis* of smiling from adolescence to adulthood showed that females tend to smile more frequently across contexts and cultures ($d = -0.41$). Average differences peak in adolescence ($d = -0.56$) and decrease with age ($d = -0.11$ in seniors); also, effect sizes are especially large in North American countries (LaFrance et al., 2003). As with language use, gender differences in smiling are highly contingent on contextual factors; for example, males and females differ more when they believe they are being observed than when they believe they are alone ($d = -0.46$ vs -0.19). Gender differences in crying are larger and more robust than those in smiling. Across cultures, females show a stronger tendency to cry ($d = -1.11$) and cry more often than males do ($d = -0.94$). Also, gender differences in crying tend to be larger in more individualistic, gender-egalitarian countries (van Hemert et al., 2011).

Nonverbal Decoding

In addition to being more expressive, females are generally better at processing and decoding other people's nonverbal behavior. In her *meta-analysis*, Hall (1984) found an overall effect size $d = -0.43$ for nonverbal decoding skills across communicative modalities. The female advantage in processing facial expressions tends to be smaller in childhood and adolescence ($d \approx -0.20$; McClure, 2000). There is some evidence that gender differences in expression processing may peak in infancy, decrease in early childhood, then peak again in middle childhood (McClure, 2000).

Summary

Females enjoy a general advantage in communication skills, both in the verbal domain (with the exception of verbal analogies) and in the production and decoding of nonverbal displays. The higher expressiveness of females is reflected in a higher frequency of both smiling and crying; gender differences in crying are especially robust, and tend to increase in more gender-egalitarian countries. Consistent with the data on personality and social relations, males tend to use more assertive speech and interrupt their conversation partners more often, while females tend to use more affiliative and tentative speech. However, gender differences in language use are highly dependent on contextual factors, testifying to the remarkable strategic flexibility of human communication.

See also: Crime and Gender; Evolutionary Social Psychology; Gender Development: Cultural Differences; Language and Gender; Personality Development and Temperament; Personality, Evolutionary Models of; Psychometrics; Systematic Reviewing and Meta-Analysis.

Bibliography

Anderson, K.J., Leaper, C., 1998. Meta-analyses of gender effects on conversational interruption: who' what' when' where' and how. *Sex Roles* 39, 225–252.

Archer, J., 2009. Does sexual selection explain human sex differences in aggression? *Behavioral and Brain Sciences* 32, 249–266.

Archer, J., Mehdkhani, M., 2003. Variability among males in sexually selected attributes. *Review of General Psychology* 7, 219–236.

Balliet, D., Li, N.P., Macfarlan, S.J., Van Vugt, M., 2011. Sex differences in cooperation: a meta-analytic review of social dilemmas. *Psychological Bulletin* 137, 881–909.

Beauchaine, T.P., 2007. A brief taxometrics primer. *Journal of Clinical Child and Adolescent Psychology* 36, 654–676.

Benenson, J.F., 2013. The development of human female competition: allies and adversaries. *Philosophical Transactions of the Royal Society B* 368, 20130079.

Bettencourt, B.A., Miller, N., 1996. Gender differences in aggression as a function of provocation: a meta-analysis. *Psychological Bulletin* 119, 422–447.

Borkenau, P., Hřebíčková, M., Kuppens, P., Realo, A., Allik, J., 2013. Sex differences in variability in personality: a study in four samples. *Journal of Personality* 81, 49–60.

Breaugh, J.A., 2003. Effect size estimation: factors to consider and mistakes to avoid. *Journal of Management* 29, 79–97.

Byrnes, J.P., Miller, D.C., Schafer, W.D., 1999. Gender differences in risk taking: a meta-analysis. *Psychological Bulletin* 125, 367–383.

Card, N.A., Stucky, B.D., Sawalani, G.M., Little, T.D., 2008. Direct and indirect aggression during childhood and adolescence: a meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development* 79, 1185–1229.

Carli, L.L., 1982. Are women more social and men more task oriented? A meta-analytic review of sex differences in group interaction, reward allocation, coalition formation, and cooperation in the Prisoner's Dilemma game. Unpublished manuscript, University of Massachusetts, Amherst.

Carothers, B.J., Reis, H.T., 2013. Men and women are from earth: examining the latent structure of gender. *Journal of Personality and Social Psychology* 104, 385–407.

Chaplin, T.M., Aldao, A., 2013. Gender differences in emotion expression in children: a meta-analytic review. *Psychological Bulletin* 139, 735–765.

Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences*. Erlbaum, Hillsdale, NJ.

Costa, P.T., Terracciano, A., McCrae, R.R., 2001. Gender differences in personality traits across cultures: robust and surprising findings. *Journal of Personality and Social Psychology* 81, 322–331.

Cross, C.P., Copping, L.T., Campbell, A., 2011. Sex differences in impulsivity: a meta-analysis. *Psychological Bulletin* 137, 97–130.

Del Giudice, M., 2009. On the real magnitude of psychological sex differences. *Evolutionary Psychology* 7, 264–279.

Del Giudice, M., 2013. Multivariate misgivings: is *D* a valid measure of group and sex differences? *Evolutionary Psychology* 11, 1067–1076.

Del Giudice, M., Booth, T., Irwing, P., 2012. The distance between Mars and Venus: measuring global sex differences in personality. *PLoS One* 7, e29265.

DeYoung, C.G., Weisberg, Y.J., Quilty, L.C., Peterson, J.B., 2013. Unifying the aspects of the Big Five, the interpersonal circumplex, and trait affiliation. *Journal of Personality* 81, 465–475.

Eagly, A.H., Crowley, M., 1986. Gender and helping behavior: a meta-analytic review of the social psychological literature. *Psychological Bulletin* 100, 283–308.

Ellis, L., Hershberger, S., Field, E., Wersinger, S., Pellis, S., Geary, D., Palmer, C., Hoyenga, K., Hetsroni, A., Karadi, K., 2008. *Sex Differences: Summarizing More than a Century of Scientific Research*. Psychology Press, New York.

Else-Quest, N.M., Hyde, J.S., Goldsmith, H.H., Van Hulle, C.A., 2006. Gender differences in temperament: a meta-analysis. *Psychological Bulletin* 132, 33–72.

Feingold, A., 1994. Gender differences in personality: a meta-analysis. *Psychological Bulletin* 116, 429–456.

Geary, D.C., 2010. *Male, Female. The Evolution of Human Sex Differences*, second ed. APA Press, Washington, DC.

Geary, D.C., Byrd-Craven, J., Hoard, M.K., Vigil, J., Numtee, C., 2003. Evolution and development of boys' social behavior. *Developmental Review* 23, 444–470.

Hall, J.A., 1984. *Nonverbal Sex Differences*. Johns Hopkins University Press, Baltimore, MD.

Hedges, L.V., 2008. What are effect sizes and why do we need them? *Child Development Perspectives* 2, 167–171.

van Hemert, D.A., van de Vijver, F.J.R., Vingerhoets, A.J.J.M., 2011. Culture and crying: prevalences and gender differences. *Cross-Cultural Research* 45, 399–431.

Hyde, J.S., 2005. The gender similarities hypothesis. *American Psychologist* 60, 581–592.

Hyde, J.S., 2013. Gender similarities and differences. *Annual Review of Psychology* 65, 373–398. <http://dx.doi.org/10.1146/annurev-psych-010213-115057>.

Hyde, J.S., Linn, M.C., 1988. Gender differences in verbal ability: a meta-analysis. *Psychological Bulletin* 104, 53–69.

- LaFrance, M., Hecht, M.A., Levy Paluck, E., 2003. The contingent smile: a meta-analysis of sex differences in smiling. *Psychological Bulletin* 129, 305–334.
- Leaper, C., Ayres, M.M., 2007. A meta-analytic review of gender variations in adults' language use: talkativeness, affiliative speech, and assertive speech. *Personality and Social Psychology Review* 11, 328–363.
- Leaper, C., Robnett, R.D., 2011. Women are more likely than men to use tentative language, aren't they? A meta-analysis testing for gender differences and moderators. *Psychology of Women Quarterly* 35, 129–142.
- Leaper, C., Smith, T.E., 2004. A meta-analytic review of gender variations in children's language use: talkativeness, affiliative speech, and assertive speech. *Developmental Psychology* 40, 993–1027.
- Lippa, R.A., 2010. Gender differences in personality and interest: when, where, and why? *Social and Personality Psychology Compass* 3, 1–13.
- Mather, M., Lighthall, N.R., 2012. Risk and reward are processed differently in decisions made under stress. *Current Directions in Psychological Science* 21, 36–41.
- McClure, E.B., 2000. A meta-analytic review of sex differences in facial expression processing and their development in infants, children, and adolescents. *Psychological Bulletin* 126, 424–453.
- Schmitt, D.P., Realo, A., Voracek, M., Allik, J., 2008. Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *Journal of Personality and Social Psychology* 94, 168–182.
- Vacha-Haase, T., Thompson, B., 2004. How to estimate and interpret various effect sizes. *Journal of Counseling Psychology* 51, 473–481.
- Vaillancourt, T., 2013. Do human females use indirect aggression as an intrasexual competition strategy? *Philosophical Transactions of the Royal Society B* 368, 20130080.
- Voracek, M., Mohr, E., Hagmann, M., 2013. On the importance of tail ratios for psychological science. *Psychological Reports: Measures & Statistics* 112, 872–886.
- Weisberg, Y.J., DeYoung, C.G., Hirsh, J.B., 2011. Gender differences in personality across the ten aspects of the Big Five. *Frontiers in Psychology* 2, 78.