



Sex or gender? Expanding the sex-based view by introducing masculinity and femininity as predictors of financial risk taking

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Abstract

Women have proven to be more risk-averse than men in investment decisions in many studies. In Western cultures, risk taking is perceived as a masculine characteristic. We therefore hypothesize that the more people associate themselves with masculine attributes, the more financial risks they tend to take, regardless of biological sex. Study 1 showed that differences between men and women in financial risk taking decreased when identification with masculine attributes remained constant. Femininity, on the other hand, was not related to financial risk taking. In the second study, gender priming on masculinity and femininity affected risk taking of the male sample.

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1. Introduction

It is commonly accepted that demographic (e.g., gender, age, education), socio-economic (e.g., income, profession), and personality aspects (e.g., sensation-seeking, attitudes) influence a person's level of financial risk taking (Morse, 1998). Past research shows that women tend to be more risk-averse when investing than men (e.g., Bernasek & Shwiff, 2001; Jianakoplos & Bernasek, 1998; Powell & Ansic, 1997).

Observed differences between men and women in financial risk taking were explained with regard to various theories, which may be roughly divided into those providing on the one hand biological, and on the other, social explanations (e.g., Anselmi & Law, 1998). Theories that stress biological reasons label differences between men and women as sex differences and name hormones and genes (Buss, 1989, 1994; Saad & Gill, 2000) as an underlying basis for these differences. In contrast, social and psychological theories outline predominantly sex-specific socialization as a reason for the observed behavioral differences between men and women. In order to stress the social and cultural basis of differences, sociological and psychological theories use the term “gender differences” for describing differences between men and women (e.g., Deaux, 1985; Eagly & Steffen, 1984; Unger, 1979, 1992).

Scientific elaboration on the distinction between sex and gender differences is part of the nature–nurture debate which has a long history in psychology. It is naïve to assume that any differences between men and women can be explained by either biological or social reasons, because both effects interact and can hardly be disentangled (e.g., Anselmi & Law, 1998; Deaux, 1985). However, there is a difference in the temporal perspective and resistance to change, depending on whether observed differences between men and women are predominantly affected by biological or social factors (see e.g., Buss, 1994; Daly & Wilson, 1983).

To our knowledge, in past studies on gender differences in financial risk taking, authors did not explicitly distinguish between biological sex (female and male) and gender (feminine and masculine). Taking into account femininity and masculinity is crucial, because representations of femininity and masculinity have been tackled by changes in social structures and social roles (Eagly, 2001). Recent research has shown that the difference between men and women in terms of masculinity has decreased (e.g., Auster & Ohm, 2000; Twenge, 1997). Masculine attributes are no longer restricted solely to men. Women may also display masculine attributes and act in what was traditionally considered a “masculine” way.

The purpose of this article is to expand research regarding gender differences in financial risk taking. Financial risk taking by men and women was studied by distinguishing between sex and masculinity/femininity as a result of gender socialization. In the first study we captured actual financial investment behavior with a questionnaire. The second experimental study addressed whether priming gender roles may affect financial risk taking. With the distinction into biological sex and masculinity and femininity as gender roles, it is possible to gain new insights into the understanding of gender differences in financial risk taking.

2. Financial risk taking

Risk is an important characteristic of investments and commonly used to classify assets from a macroeconomic perspective (Olsen & Cox, 2001). An asset's risk depends on the

uncertainty regarding the flows of returns that the asset is producing in the future (Greenspan, 1999). The risk of an asset may be quantified by complex market measures, which are primarily used by professional investors, and simpler indicators, which focus only on an asset's attributes and are applied more commonly by lay investors. The Beta-coefficient of the Capital Asset Pricing Model (Barber & Odean, 2001; Fama & French, 1993) as an indicator of market risk is one example of a complex measure of risk (for a detailed discussion see Barber & Odean, 2001; Fama & French, 1993; Lakonishok, Shleifer, & Vishny, 1994; LeRoy & LaCivita, 1981).

A simple, more traditional method of quantifying risk of assets comprises measuring the volatility of returns (Fong & Vasicek, 1997). Volatility depicts the extent of probable future fluctuation of returns and additionally mirrors the stability of a market (Dunn, 2002; Greenspan, 1999). Volatility is also a variable that is observable on a daily basis and therefore a highly visible characteristic of assets (Goetzmann & Massa, 2003). High volatility usually coincides with high possible profitability and high commitment. While profitability refers to the return on the investment as determined by interest rates, dividends, or the difference between purchased and sold price, commitment indicates the period of time for which money is tied up and cannot be invested elsewhere. Volatility, profitability, and commitment are interdependent (Greenspan, 1999; Ratajczak, 2003). Investments can therefore be represented by their risk, with savings accounts or long term treasury bonds as low-risk (no risk, no commitment, low profit) and small cap stocks as high-risk investments (risky, possible high profit, higher commitment, Olsen & Cox, 2001; Szallies, 1999).

Higher female risk aversion in investment behavior was found in various empirical studies. Women and men differed in actual investment behavior (e.g., Barber & Odean, 2001; Bernasek & Shwiff, 2001; Jianakoplos & Bernasek, 1998), in hypothetical choices (e.g., Powell & Ansic, 1997), in gambling/lottery situations (e.g., Eckel & Grossman, 2002; Hartog, Ferrer-i-Carbonell, & Jonkert, 2002; Heilizer & Cutter, 1971; Siegrist, Cvetkovich, & Gutscher, 2002), and in attitudes and intentions toward financial risk taking (e.g., Weber, Blais, & Betz, 2002). Women more often chose assets which impose few risks and refrain from selecting higher risk assets. They turned out to be less favorable in risk-attitude scales and more cautious in hypothetical financial choices than men. Even professional female investors are more risk-averse than male fund managers (Bliss & Potter, 2002; Olsen & Cox, 2001). Gender differences are more pronounced in singles than people living in heterosexual partnerships, because a higher degree of interaction between the sexes is assumed (Jianakoplos & Bernasek, 1998).

3. Sex or gender differences?

In the reported studies on gender differences in financial risk taking, authors did not distinguish explicitly between biological sex and the social construction of gender. Differences between men and women were analyzed by asking respondents about their biological sex. In general, the expression "gender" is often used without careful consideration. Sometimes it is employed as a synonym for biological sex (Doyle & Paludi, 1998), and reported differences between women and men are summarized as gender differences (Shields & Eysell, 2001). Other authors, on the contrary, clearly differentiate between sex and gender (e.g., Deaux, 1985; Lott & Maluso, 2001; Unger, 1979). Sex indicates "innate structural and physiological characteristics" and separates not only the human but also animal

species into female and male. Gender, however, “connotes all the complex attributes that a culture ascribes to each of the sexes”. Gender is thus a socially constructed category and “reflects the culture’s definition of femininity and masculinity” (Lott & Maluso, 2001, p. 537).

Differences between men and women in their investment behavior may be explained by (1) biological, and (2) social reasons, depending on whether differences are believed to be rather grounded in biological conditions (sex differences) or, instead, in gender socialization (gender differences). (1) Theories, which rely on biological reasons, assume that hormones and genes are the underlying basis for sex differences in financial risk taking. In the case of hormones, men’s naturally lower level of arousal is perceived as the reason for their higher tendency to take risk. The thrill of uncertain consequences helps to balance the lower level of arousal and activates the individual. Taking risks therefore fulfils the need for sensation-seeking, one of the personality traits studied by Zuckerman (1991). Consistent sex differences on the sensation seeking scale (SSS-V) were found where men scored higher than women (McDaniel & Zuckerman, 2003; Zuckerman, 1994).

Behavioral genetics (Plomin, 2001) and evolutionary psychology (Buss, 1994) as the human variant of sociobiology (Wilson, 1975), explain individual differences in behavior by underlying genetic conditions. With the ultimate goal of inclusive fitness (Hamilton, 1964), men and women strive to maximize their number of offspring and those of kin members. Women look for partners who are able to secure a reliable supply of resources for them and their children. Men with a high social status and available resources are preferred by women as mates to poorer men with fewer resources. Men are therefore supposed to take higher risks to increase their financial resources in order to be an attractive mate (Hamilton, 1964). In a cross-cultural analysis, Buss (1989) confirmed a general female preference for male mates with high financial capacities.

(2) Theories that explain found differences in behavior between men and women based on social reasons identify gender socialization as the underlying cause. Individuals learn what behavior, attitudes, or beliefs are socially accepted for women and men and behave according to these socially shared gender norms. Gender norms are the prescriptive guidelines of, and are comprised of gender roles (Doyle & Paludi, 1998). Traditionally, men and women are supposed to take on different social roles, which shape stereotypes about gender characteristics (“social role theory” by Eagly, 1987; Eagly & Steffen, 1984). Self-assertiveness, agency, and motivation to master are masculine attributes as described in the male sex role stereotype. At least in Western cultures, risk taking is perceived as a masculine attribute (Wilson & Daly, 1985). The female sex role stereotype on the other hand includes characteristics such as being communal, selfless, and caring. In traditional partnerships, husbands dominate decisions about important financial affairs, such as investments and wealth and wives are responsible for decisions about day-to-day expenditures and keeping papers in order (e.g., bookkeeping Assar & Bobinski, 1991; Kirchler, Rodler, Hoelzl, & Meier, 2000).

Both biological and social perspectives base their explanations for found differences in financial risk taking between men and women on male dominance in relation to the social status of women. Biological theories in general and evolutionary psychology in particular claim to provide ultimate explanations and tend to oversimplify complex phenomena (Doyle & Paludi, 1998). Of all types of risk, Grant (2000) argues, explanations derived from evolutionary theory apply only to physical risk (Campbell, 1999). From this specific difference, general sex differences in dominance and status-seeking were derived. In

contrast, explanations based on social reasons allow for more individual variability and seek to combine individual and situational factors in their explanations of behavior e.g., “expectancy value model” by Atkinson (1983); “theory of broad and narrow socialization” by Arnett (1992).

In line with many authors, we assume that biological and social factors interact in shaping gender specific behavior. Gender roles basing on the traditional division of labor as well as biological conditions support risk taking of men and hinder women in their tendency to take risks. As both effects lead in the same direction, impacts cannot be disentangled and separated. In times of social change, changing social roles of women and men may start to counteract effects of biological predispositions on risk taking. Since masculine attributes are not only socially acceptable but also desirable for women (Taylor & Hall, 1982), women are starting to adopt masculine attributes, such as a higher tendency to take risk or to behave in an agentic way. The strict attribution of masculine characteristics to men and feminine characteristics to women is no longer rigidly followed. The introduction of masculinity and femininity as predictors of financial risk taking may help to expand existing research on gender differences in investment behavior.

This article will present results from two studies. We hypothesized that the more people display masculine attributes, the more financial risk they are willing to take, regardless of their biological sex. In addition, we tested whether masculinity and femininity mediated the influence of biological sex on financial risk taking. In the first study, effects of biological sex (female and male) and gender (feminine and masculine attributes) on financial risk taking were considered separately and the influence of femininity and masculinity on financial risk taking was analyzed. In the second study, an experimental design was applied in order to anticipate social changes to extend the range of masculinity and femininity among men and women, respectively. In particular, we tested whether identification with masculine attributes (feminine attributes) leads to more (less) financial risk taking, regardless of biological sex.

4. Study 1

4.1. Method

Participants. An opportunity sample of 186 respondents completed the questionnaire. Sex was nearly balanced (101 women, 85 men). Average age was $M = 40.30$ ($SD = 12.90$) with ages ranging between 19 and 81 years. Educational level was rather high: 28% graduated from a college or university, 37% held a secondary school diploma, 31% had finished vocational school, and 3% had attended primary school. The annual net income was on average about 21.500 €. As expected, men reported a higher income than women. Age and educational level was equal across both sub-samples.

Procedure. Participants were recruited by personal contacts and in public spaces (e.g., communities, fitness center). It took about 30 min to complete the questionnaire. Data was sampled in winter 2001.

Material. The questionnaire consisted of risk measures, Bem's Sex Role Inventory (1974), and socio-demographic variables. Financial risk taking was measured by four different risk indices, which captured both actual investment behavior and hypothetical financial decisions: (a) Actual investment behavior: Participants indicated the percent of their investments distributed to different asset types, ranging from savings accounts to

shares. (b) Investment scenario: Respondents imagined that by the end of the year they still had 7200 € in their bank accounts, which they wanted to invest. They were presented with five investment options with equal expectancy values but different probability and extent of potential losses. The risks of the options were estimated according to the risk of a potential loss. In addition, we used (c) Waerneryd's (2000) scale to assess people's attitudes toward risk taking in investment behavior, which consisted of six items (i.e., "I am prepared to take the risk to lose money, when there is also a chance to gain money"). (d) In order to complement risk measures with a more general risk taking scale, a risk taking scale, which is a subscale from the MPT (mehrdimensionaler Persoenlichkeitstest, Schmidt, 1981), was applied. Bem's Sex Role Inventory (Bem, 1974) was presented in the German translation by Schneider-Dueker and Kohler (1988). Despite criticism of and problems with the inventory (see e.g., Palan, Areni, & Kiecker, 1999) the BSRI proved to measure masculinity and femininity best in comparison to PAQ (Personal Attribute Questionnaire, Spence & Helmreich, 1978) and SIS (Sexual Identity Scale, Stern, Barak, & Gould, 1987). In the BSRI, people described themselves on a list of 60 attributes. A femininity index, a masculinity index, and an index summarizing scores on sex-neutral attributes (e.g., healthy, trustful, industrious) can be formed using 20 attributes each.

4.2. Results

Overview. Actual investment behavior of only 155 participants was analyzed, 31 participants were excluded due to missing data and data unable to be categorized. In particular, missing were data on the relative contribution of actual investment to the presented assets. In general, low-risk assets were preferred, such as savings accounts (frequency (f) = 134) and building society savings plans (f = 107). High-risk assets were rarely chosen (investment funds: f = 32, shares: f = 28).

Asset types were categorized by experts along a seven point scale (Meier, Kirchler, & Hubert, 1999); poles were represented by savings accounts and shares, respectively. Savings accounts were judged as involving only a low risk and were assigned the value "1". Shares as high-risk assets had the value of "7". Participants' indication of assets owned was weighted relative to their contribution to the entire investment (e.g., people indicating savings accounts as their only asset type had a risk value of 1). This index ranged between 1 and 7, higher values indicating higher financial risk taking. In addition, Waerneryd's index and the risk taking scale taken from the MPT (9 items) were checked for reliability (α = 0.81, α = 0.88) and were subsequently averaged. All four risk measures correlated significantly to a medium extent (correlations between risk measures, masculinity, femininity, and socio-demographic variables are depicted in Table 1).

The femininity and masculinity scales were checked for reliability. After excluding one item from the masculinity scale, reliability was satisfactory, Cronbach alpha α = 0.76 (femininity), α = 0.86 (masculinity). Respective items of the masculinity and femininity scale were averaged. Femininity and masculinity correlated only slightly (Table 1), which is in line with the conception of masculinity and femininity as two independent dimensions (Bem, 1974).

Univariate analysis of variance resulted in a significant main effect of biological sex on the masculinity and femininity scale, respectively, masculinity scale: $F(1, 150) = 6.90$, $p = 0.01$, $\eta^2 = 0.04$; femininity scale: $F(1, 150) = 11.89$, $p < 0.01$, $\eta^2 = 0.07$. As expected, men showed higher identification with masculine attributes than women. Results on the

Table 1
Correlations between risk-taking measures, masculinity, femininity, and socio-demographic variables

	2	3	4	5	6	7	8	9	10
Actual investment behavior	0.32**	0.41**	0.34**	0.42**	0.03	0.18*	0.07	0.04	0.25**
Scenario (2)		0.42**	0.34**	0.18*	-0.09	0.12	-0.24	0.09	0.04
Waerneryd (3)			0.48**	0.26**	-0.13	0.35**	-0.25	0.16	0.12
MPT (4)				0.54**	-0.02	0.36	-0.28	0.22	0.08
Masculinity (5)					0.20*	0.21**	-0.10	0.17*	0.23**
Femininity (6)						-0.27**	-0.24**	0.30**	-0.06
Sex (7)							0.07	-0.10	0.31**
Age (8)								-0.27**	0.29**
Education (9)									0.20*
Income (10)									

Note. Biological sex was coded female = 0, male = 1. Asterisks indicate significant correlation.

* $p < 0.05$.

** $p < 0.01$.

femininity scale were found to be the reverse, masculinity scale: $M_{\text{men}} = 4.86$ (SD = 0.77), $M_{\text{women}} = 4.56$ (SD = 0.66); femininity scale: $M_{\text{men}} = 4.62$ (SD = 0.52), $M_{\text{women}} = 4.93$ (SD = 0.58).

Age and income turned out to be correlated to masculinity and femininity (Table 1). In order to control for possible effects, both variables were added as covariates. The main effect of biological sex was still significant, masculinity scale: $F(1, 145) = 4.48$, $p = 0.04$, $\eta^2 = 0.03$; femininity scale: $F(1, 145) = 12.12$, $p < 0.01$; $\eta^2 = 0.08$. Moreover, income had a significant main effect on the masculinity scale, $F(1, 145) = 6.39$, $p = 0.01$, $\eta^2 = 0.04$. Age showed a significant main effect on the femininity scale and to a minor degree on the masculinity scale, masculinity scale $F(1, 145) = 4.33$, $p = 0.04$, $\eta^2 = 0.03$; femininity scale: $F(1, 145) = 8.78$, $p < 0.01$, $\eta^2 = 0.06$. The more people earned, the more likely they were to describe themselves with masculine attributes. In addition, with increasing age, scores on the femininity and masculinity index decreased: relatively older people were less likely than younger people to describe themselves with feminine and masculine attributes, respectively.

Effects of sex, and masculinity and femininity on financial risk taking. In a first step, effects of biological sex on the four risk measures were analyzed. Results of the multivariate analysis of variance revealed a significant main effect of biological sex, $F(4, 142) = 8.45$, $p = 0.01$, $\eta^2 = 0.19$. As expected, men reported higher risk taking than women in actual investment behavior, in the scale on attitudes toward financial risk taking (Waerneryd, 2000), and in the subscale of the MPT (Table 2). In the risk measure of the scenario, no significant difference between men and women was observed. In a second step, the femininity and masculinity scales were added as covariates. The masculinity scale showed a highly significant effect on the risk measures, $F(4, 140) = 15.40$, $p = 0.01$, $\eta^2 = 0.31$. Femininity did not affect risk taking, $F(4, 140) < 1.00$. As a consequence, the extent of effect of biological sex was diminished, $F(4, 140) = 4.84$, $p = 0.01$, $\eta^2 = 0.12$. In all four risk measures, differences between men and women decreased after the effect of masculinity was held constant. Significant sex differences in actual behavior even disappeared after the introduction of the masculinity scale as covariate (Table 2). Age and income as additional covariates did not modify this result. Apart from actual investment behavior, age correlated negatively with risk taking, $F(4, 135) = 8.29$, $p < 0.01$, $\eta^2 = 0.20$.

Table 2
Effects of biological sex on risk taking

	Actual behavior <i>M</i> (SD)	Scenario <i>M</i> (SD)	Waerneryd <i>M</i> (SD)	MPT <i>M</i> (SD)
<i>Without masculinity and femininity</i>				
Men	2.16 (1.28)	2.54 (1.34)	3.41 (1.41)	4.05 (1.44)
Women	1.73 (0.88)*	2.25 (1.18)	2.49 (1.02)*	2.91 (1.26)*
<i>With masculinity and femininity as covariates</i>				
Men	2.04 (1.06)	2.45 (1.30)	3.30 (1.25)	3.85 (1.23)
Women	1.83 (1.06)	2.33 (1.29)	2.58 (1.24)*	3.09 (1.23)*

Note. Asterisks indicate significant between-subject effects in the respective risk measures.

It was further checked whether masculinity and femininity mediated the influence of biological sex on financial risk taking. Baron and Kenny (1986) proposed a series of regression analyses to test for mediator variables. However, we followed Suri and Monroe (2003) who tested mediator variables with analyses of co-variance. We chose analyses of co-variance for two reasons: (a) Analyses of co-variance as computed in general linear models (SPSS software) are based on procedures comparable to regression analyses, and (b) analyses of co-variance allow for more than one dependent variable. Basing on the previous reported results, biological sex significantly affected masculinity and femininity respectively. Masculinity, in turn, influenced financial risk taking significantly, whereas femininity showed no effects on the risk measures. Effects of biological sex on risk taking were significant, but decreased after the introduction of masculinity and femininity as covariates. To summarize, masculinity seems to mediate the influence of biological sex on financial risk taking. Femininity, on the other hand, does not seem to impact financial risk taking.²

Thus far, main effects of masculinity and femininity on financial risk taking were analyzed and whether or not masculinity and femininity served as mediator variables was assessed. In order to test whether masculinity affects financial risk taking for both sexes equally, interaction effects between biological sex and sex role stereotypes were analyzed with moderated regression analyses. Only one significant interaction effect was found, namely the interaction between sex and the femininity scale in explaining Waerneryd's attitudes toward financial risk taking³: the more men displayed feminine attributes, the less they were willing to take risks in the hypothetical setting. All other interactions between masculinity, femininity, and biological sex were not significant on the four risk measures.

4.3. Discussion

As expected, women were more risk-averse than men in investment decisions. Higher female than male risk aversion was confirmed in actual investment behavior, in hypothetical financial decision making, and in the items measuring general risk taking behavior. However, biological sex had a minor statistical effect than the masculinity scale, which

² Mediation analyses were also carried out for the male and female sub-sample, respectively, effects of masculinity were equal, femininity showed an effect only in the male sub-sample.

³ $R^2(2, 181) = 0.14$; $p < 0.01$: $Y = 2.55 + 0.87 \text{ sex} + 0.20 \text{ femininity} + (-0.82) \text{ sex} \times \text{femininity}$. Variable "sex" was coded "0" as female, "1" as male.

mediated the effects of biological sex on financial risk taking: The more people displayed masculine attributes, e.g., competitiveness and assertiveness, the more risks they tended to take. Keeping masculinity constant, differences between men and women in actual investment behavior faded. In hypothetical financial decisions, sex differences were still observed, but to a lesser degree. Femininity, on the other hand, seems not to affect risk taking behavior in general. Females were constantly lower on risk-taking. In only one scale on hypothetical financial decision making, men showed less risk taking the more they described themselves with feminine attributes. This interaction should therefore be interpreted with caution.

This study does not contradict previous findings of differences between men and women in their financial risk taking (e.g., [Bernasek & Shwiff, 2001](#); [Powell & Ansic, 1997](#)). Consistent and stable sex differences are confirmed when other variables such as age and, more importantly, masculinity are not taken into account. However, the importance of biological sex as a predictor of financial risk taking seems to lie behind effects of masculinity. The more people feel congruence with the male sex role stereotype, the more risk they are willing to take in financial decision making, regardless of their biological sex.

Recently, the strict separation of social roles between the sexes has been questioned. Nonetheless, sex role stereotypes are slow to change. In the first study, masculine attributes still seemed to apply more to men than to women. And women showed a higher congruence with feminine attributes than did men. In order to have a wider range of masculinity and femininity in both sexes, a subsequent experiment with gender priming was conducted. Participants were primed with the male sex role stereotype, female sex role stereotypes, and in a gender-neutral way, respectively. Due to priming, the cognitive schema of the respective sex role stereotype is activated and participants are assumed to behave according to the activated stereotype ([Bargh, 2002](#); [Bargh & Chartrand, 1999](#)). Recently, priming gained importance as an innovative method in research on consumer behavior (i.e., [Kirmani, Lee, & Yoon, 2004](#); [Mandel, 2003](#); [Verplanken & Holland, 2002](#)) and as a mechanism, which also proved its relevance beyond the laboratory (i.e., [Forehand & Deshpande, 2001](#)). Social judgments and consumer choices may be strongly influenced by automatically activated processes ([Bargh, 2002](#); [Stafford, 2000](#)).

In the second study, between-sex variability in masculinity and femininity was assumed to increase due to gender priming: Participants were expected to characterize themselves as more masculine (after priming with the male sex role stereotype) or as more feminine (after priming with the female sex role stereotype). Priming with a gender neutral stimuli was not expected to affect scores of masculinity and femininity. Similar to the first study, we hypothesized that identification with masculine attributes should support risk taking tendencies, regardless of biological sex.

5. Study 2

5.1. Method

Participants. In total, 180 students participated from the human and social science department of the University of Vienna. Average age was $M = 23.77$ ($SD = 4.63$); the majority (68%) indicated a monthly income of less than 730 US \$. Respondents were contacted at the university campus and asked to participate in the study. People were randomly assigned to the three different priming tasks. In a first step, they were asked to

complete the priming task, which was masked as a questionnaire on everyday experiences and took about 10 min. They then had to switch rooms and complete the questionnaire on risk measures, sex role stereotypes, and socio-demographic variables (again about 10 min). Afterward, all participants were informed about the priming procedure and the actual research objective.

Material. In the second study, a 3 (priming masculine/feminine/control) \times 2 (biological sex) between subjects' design was applied. As for the *priming task*, we used visual and semantic priming. Participants were asked to complete a questionnaire on everyday experiences. They were presented a picture, either of a young man in business clothes equipped with phone and filofax (masculine priming), or a young woman looking after a baby (feminine priming), or a group consisting of six young people (control group). Respective pictures were projected on the wall and depicted in the questionnaire. Participants were asked to go deeply into the person/group in the picture and to figure out what he/she or the group was thinking, feeling, and planning for the evening. After the visual priming, five incomplete sentences were presented including masculine (e.g., ambitious, willing to risk, rational), feminine (e.g., sensitive to other's needs, compassionate, tender) and gender neutral attributes (e.g., reliable, impolite, sociable), all taken from Bem's Sex Role Inventory (1974). Participants were asked to fill in the gaps of the incomplete sentences. The stories that the participants wrote about the stimulus person(s) were in line with the purpose of the priming procedure and served as a manipulation check.

After the priming task, participants completed a questionnaire consisting of three risk measures (scenario, Waerneryd's scale, and the subscale taken from the MPT) and Bem's Sex Role Inventory in the German translation by Schneider-Dueker and Kohler (1988). Materials are described in detail in the first study.

5.2. Results

Overview. The femininity and masculinity scales, and two of the three risk measures – Waerneryd's scale of attitudes toward financial risk and the subscale on risk taking from the MPT – were checked for reliability. As all Cronbach alphas were higher than $\alpha = 0.75$, respective items were averaged. In order to check for outliers which violate statistical tests, distributions of observations were examined. Cases falling between 2 and 3 standard deviations outside the average values were identified (Hair, Anderson, Tatham, & Black, 1998) and excluded from analyses ($n = 12$). Similar to the first study, masculinity and femininity correlated only to a small degree, $r(168) = 0.17$, $p = 0.03$. Risk measures were interrelated, Pearson correlation, r ranged between 0.16 and 0.40.

In order to check for manipulation, effects of gender priming and effects of biological sex on masculinity and femininity were computed. On the masculinity scale, interaction between priming and sex, $F(2, 162) = 3.02$, $p = 0.05$; $\eta^2 = 0.04$, qualified the significant main effect of gender priming, $F(2, 162) = 4.44$; $p = 0.01$; $\eta^2 = 0.05$. Only the male sample reacted to the priming procedure. They showed lower identification with masculine attributes after the female sex role priming than in the other two priming situations, means (with standard deviations in parentheses) $M_{\text{female_priming}} = 4.27$ (0.54), $M_{\text{male_priming}} = 4.53$ (0.73), $M_{\text{control}} = 4.93$ (0.66). In the female sample, no effects of the different priming tasks on the masculinity scale were observed, means (with standard deviations in parentheses) $M_{\text{male_priming}} = 4.47$ (0.62), $M_{\text{female_priming}} = 4.47$ (0.69), $M_{\text{control}} = 4.54$ (0.58). On the femininity scale, only the main effect of biological sex was significant, $F(1, 162) = 18.43$;

$p < 0.01$; $\eta^2 = 0.10$. Women generally indicated higher values on the femininity scale ($M_{\text{women}} = 5.07$, $SD = 0.43$) than men ($M_{\text{men}} = 4.68$, $SD = 0.67$), and this sex difference was resistant toward gender priming.

Effects of biological sex and gender priming on financial risk taking. Effects of biological sex and priming on the risk measures were analyzed. As expected, multivariate analysis of variance yielded a significant interaction effect between sex and priming, $F(6, 312) = 2.46$, $p = 0.02$, $\eta^2 = 0.05$. On a univariate level, interaction was only significant in Waerneryd's scale on attitudes toward financial risk. Gender priming affected risk taking of the male sample in the way we have hypothesized: Men who were primed with the male sex role stereotype showed the highest tendency to take risk in investment behavior, followed by the control group and men who were primed with the female sex role stereotype, means (with standard deviations in parentheses) $M_{\text{male_priming}} = 3.57$ (1.30), $M_{\text{control}} = 2.98$ (0.82), $M_{\text{female_priming}} = 2.60$ (0.81), Fig. 1. In contrast, gender priming had no effects on risk taking in the female sample.

To compare results of the second study with those obtained from the first study, a multivariate analysis of variance was computed, with the three risk measures as dependent variables and biological sex as independent variable. In a next step, masculinity and femininity were introduced as covariates. While attachment to the masculinity scale fostered hypothetical financial risk taking, $F(3, 157) = 7.05$, $p < 0.01$, $\eta^2 = 0.12$, femininity produced no significant effect, $F(3, 173) = 1.85$, $p = 0.14$. Effects of biological sex were not significant in either analysis, without covariates: $F(3, 159) = 2.30$, $p = 0.08$; with masculinity and femininity as covariates: $F(3, 157) = 2.21$, $p = 0.09$. Possible interactions between biological sex and sex role stereotypes were analyzed by moderated regression analyses and were not significant.

5.3. Discussion

In the second study, results of the first study were replicated and specified in more detail: Masculinity was confirmed to be a predictor of financial risk taking. Femininity,

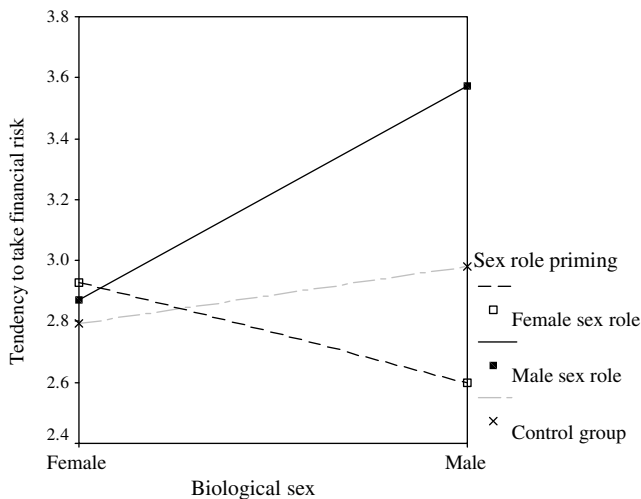


Fig. 1. Effects of biological sex and gender priming on attitudes toward financial risk taking.

on the other hand, seems not to affect financial risk taking. Two results obtained from the second study are worth discussing: (1) No sex differences in the masculinity scale were found and (2) women did not respond to the priming procedure. In contrast to the adult sample of the first study, men and women from the student sample did not differ in their self-descriptions on masculine characteristics. This result is consistent with findings of [Auster and Ohm \(2000\)](#) and [Twenge \(1997\)](#), who reported that differences between men and women on the masculinity scale have decreased over the last thirty years. In general, masculine attributes such as risk taking are considered to be socially desirable ([Taylor & Hall, 1982](#)). Also for women, adoption of masculine traits seems to be desirable. Perceptions of masculine attributes were found to be related to individuals' level in the organization hierarchy ([Fagenson, 1990](#)) and rather masculine persons emerged as leaders and were assessed as being more attractive than non leaders in various task groups ([Goktepe & Schneider, 1989](#)). In today's business environment, women therefore often display masculine characteristics, while the reverse has not yet been observed ([Rodler, Kirchler, & Hoelzl, 2001](#)).

Explanations of the lack of female response to the different gender priming are speculative. Given the university context where women prepare themselves for the work force, the male sex role stereotype may fit their self-description more closely than the female sex role stereotype. Moreover, having a child – the woman depicted on the visual priming of the female sex role was holding a baby – seems to oppose women students' plans to enter the work force. The intensive visual and semantic priming task might have evoked awareness and conscious deliberation of the issue ([Erb, Bioy, & Hilton, 2002](#)). As a result, priming effects might have been corrected by the female sample. To test these assumptions, we plan to have a follow-up study with either a more subtle supraliminal priming or subliminal priming (e.g., [Chen & Bargh, 1997](#)) of sex role stereotypes.

6. Conclusion

In both studies, high values on the masculinity scale went along with higher financial risk taking. Identification with the female sex role, on the other hand, seems to be independent of financial risk taking: In our studies, being feminine did not mean being risk-averse, but being masculine supports risk taking. The often found difference between women and men in their tendency to take financial risks seems to be based on different levels of identification with masculine attributes. Distinguishing women and men according to their respective sex roles, biological sex and identification with the respective sex role coincided. Effects of biological sex and sex role stereotypes on risk taking appeared to be interchangeable. In recent years, women have gradually adopted masculine attributes ([Auster & Ohm, 2000](#); [Twenge, 1997](#)). In our second study, women students perceived themselves as being as masculine as our male sample. As a consequence, no sex differences in financial risk taking were found.

These findings suggest several implications for financial investment institutions. From a policy perspective, differentiation between biological sex and sex role stereotypes may help in counteracting women's general risk aversion in investment decisions. Taking into account that, in general, women still earn less money than men, their hesitation to invest in financial markets additionally contributes to the observed differences in the financial power of both sexes. [Bajtelsmit and Bernasek \(1996\)](#) and [Bernasek and Shwiff \(2001\)](#) even

conclude that female risk aversion in financial decisions is an important cause of higher female exposure to poverty in retirement.

As a start, it seems helpful to acknowledge that women's diversity contradicts simple mass-marketing strategies. The financial service industry is recognizing women's economic power and therefore women are an interesting target group for marketing activities. This article, however, is one argument for more sensitive market segmentation strategies. Business women, younger, and well-educated women may be more similar to men from similar backgrounds (education, profession) than to other women identifying themselves with the traditional female sex role. Therefore, sex role based market segmentation, in addition to occupation, age, and educational level may improve marketing activities for women, because they better account for the diversity of women's attributes and needs.

Awareness of the fact that not all women are risk averse may further help to overcome self-fulfilling prophecies in personal interactions. So far, female risk preference is underestimated by women and men (Siegrist et al., 2002). As a result, women are offered high-risk assets less often than are men (Bajtelsmit & Bernasek, 1996; Schubert, Brown, Gysler, & Brachinger, 1999). In this perspective, situational effects may cause different levels of financial risk taking, regardless of biological sex (Byrnes, Miller, & Schafer, 1999; Lopes, 1987; Schubert et al., 1999). Banking and insurance companies may explicitly encourage women with traditional sex roles to invest in higher risk assets by focusing, for example, on individual benefit and success rather than on the benefits for others. By reducing risk aversion this could positively influence the financial well-being of women in the long run.

The presented studies are the first step in a series of studies on gender differences in investment behavior. In the second study, we used priming as a method to elicit stereotype congruent behavior. However, priming also influences consumer judgments, behavior, and motivations in the real context (Bargh, 2002). According to the way potential investors are addressed and promotion activities are designed, tendencies toward risk-seeking behavior or risk aversion may be supported (Johar, Moreau, & Schwarz, 2003). Images of masculine attributes and male spokespersons in advertisements, for example, may enforce higher financial risk taking. In addition, recent banking institutes' reactions to female risk aversion may even backfire on their intentions. There are promotion activities which address women only. Women investors are invited to information evenings which are labeled as "ladies events". But with the presence of only women, feminine stereotypes may be activated and masculine attributes may be suppressed. Activities aimed at reducing female risk aversion may, on the contrary, strengthen this behavior. At the moment, these effects are rather speculative and may not be directly derived from the presented studies. In future projects we plan to test for interaction effects in real settings.

The link between masculinity and financial risk taking seems to be confirmed in the way that masculine attributes enhances people's tendency to take risks. However, taking financial risks may not be always preferable. Taking risks for the risk itself can have enormous negative consequences on a person's financial resources. Barber and Odean (2001) speak of the "male syndrome", referring to the male tendency to be overconfident and to believe strongly in their own judgment of investment options. Men also seem to be overconfident even if they experience high uncertainty or are wrong in their answers. Further research is supposed to shed some light on the question of whether masculinity as an individual characteristic leads to an underestimation of financial risk, whereas fem-

inity supports an overestimation. Thus far, empirical studies have revealed that women are found to be more concerned and more sensitive to risks and express greater concern than men (Barke, Jenkins-Smith, & Slovic, 1997; Bord & O'Connor, 1997; Lundeberg, Fox, & Puncocar, 1994). Women were also found to usually feel less informed and doubtful of whether they are capable of judging the consequences of hazards. To our knowledge, the link between masculinity and femininity and risk perceptions has not yet been sufficiently explored and could possibly present an interesting question for future research.

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