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*Manuscript

Running head: Injury-risk behaviors in preschoolers

Gender Stereotype Conformity and Age as Determinants of Preschoolers' Injury-Risk Behaviors

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Abstract

Unintentional injuries continue to be a serious public-health problem for children and are higher for boys than for girls, from infancy through adulthood. Literature on differential socialization concerning risky behaviors and gender stereotypes suggests that sex differences in unintentional injuries could be explained by children's differential feedback to social pressure, leading to behaviors which conform to masculine and feminine stereotypes. We made the prediction that boys' and girls' conformity with masculine stereotypes influences injury-risk behaviors among preschoolers. Masculinity scores, femininity scores, and injury-risk behaviors of 170 three- to six-year-old children (89 boys and 81 girls) were measured indirectly on two scales filled out by their parents. Results show that boys' and girls' injury-risk behaviors are predicted by masculine stereotype conformity and that girls' masculine behaviors decline with increasing age. These results underline the impact of gender roles — and of the differential socialization associated with those roles — on sex differences in children's risky behaviors as early as the preschool period.

Keywords: Injury – Child – Gender – Preschool – Socialization – Stereotype

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1. Introduction

Unintentional injuries continue to be a serious public health problem for children in developed countries (Baker et al., 1992), where death following injury is much more common for boys than for girls. Accidents involving boys are more frequent and more serious than those involving girls (Baker et al., 1992; Rivara et al., 1982; Rivara & Mueller, 1987). Some studies have already pointed out male gender as a predictor of injury between 6 and 36 months-old (Schwebel et al., 2004). In developed countries, boys between the ages of one and fourteen have a 70% higher probability of dying in an accident than do girls (UNICEF, 2001) and this difference persists into adulthood (Baker et al., 1992; Rivara et al., 1982).

The type and location of injuries also vary with children's age (Shannon et al., 1992). For example, injuries to infants often occur at home, whereas most injuries to school-age children happen when they are away from home and engage in risk-taking activities. Injury rates are often reported to increase with age throughout the school years, with adolescents experiencing the highest incidence of injuries (Scheidt et al., 1994). At the age of 2 to 2.5, boys were injured most often in rooms designated for play, and a majority of their injuries followed misbehavior, whereas girls were most often injured in non-play areas of the home, with the majority of injuries occurring during play activities (Morrongiello et al., 2004). Boys experienced more frequent and severe injuries than girls, although girls reacted more than boys to their injuries. Moreover, parental measurements of children’s sensation-seeking and children’s compliance show that girls were less sensation-seeking and more compliant than boys and that these two factors are

correlated with injury-risk behaviors (Morrongiello et al., 2004). Nevertheless, preschoolers older than 2.5 years were at higher risk of injury than younger ones (Dal Santo et al., 2004). Children's injury risk increases sharply, with a peak occurring between 2 and 4 years of age (Matheny, 1987). At five years of age, a study on environmental factors in the risk of unintentional injuries on 2,054 twins shows that being male was the main risk factor for injuries, always or frequently (Ordonana et al., 2008).

Previous research has shown that school-age boys tend to take more risks than girls (Byrnes et al., 1999; Coppens & Gentry, 1991; Ginsburg & Miller, 1982; Granié, 2007; Morrongiello & Dawber, 1999; Rosen & Peterson, 1990) and have more frequent and severe injuries than girls (Baker et al., 1992; Canadian Institute of Child Health, 1994). In addition, when boys and girls are involved in the same types of activities, boys exhibit more risky behaviors than girls (Morrongiello & Dawber, 1998; Rivara et al., 1982; Van der Molen, 1981, 1983). Boys were as accurate and as quick to asses risk as girls: gender difference showed up in absolute but not in relative danger appraisals. Rating for vulnerability (in "will I get hurt" terms) is the best predictor of girls' risk rating whereas boys' risk rating is best predicted by injury severity (in "how hurt will I get" terms) (Hillier & Morrongiello, 1998). Boys reported more injuries than girls and perceived them as less severe (Morrongiello, 1997). School-age boys attributed more injuries to bad luck, rated risk of injury as lower, and expressed more of an optimism bias than girls (Morrongiello & Rennie, 1998).

Boys' tendency to take more risks has been generally explained in the past by a combination of biological and evolutionary theories. Thus, the classic explanation is that the tendency to take risks varies with the level of androgen produced by the body: men have a higher level of sensation-seeking and take more risks because they produce more androgens (Social Issues

Research Centre, 2004; Zuckerman, 1991). Evolutionary psychology (Daly & Wilson, 1987) argues that men's risk taking, such as aggression and "infidelity", are the natural consequences of the basic requirements of community protection and gene dissemination. Only recently has research begun to explore social environment influences on children's sex differences in risk taking behaviors. Thus, a growing numbers of studies have shown that parents contribute to the sex differences found in children's risk taking and unintentional injuries (Hagan & Kuebli, 2007; Morrongiello & Dawber, 1999; Morrongiello & Dawber, 2000; Morrongiello & Hogg, 2004), as parents contribute to gender identity development and gender-role learning (Bussey & Bandura, 1999) by gender differential socialization (Block, 1983; McHale et al., 2003).

Numerous psychologists indeed ascribe the male-female difference in risk-taking to gender roles (Byrnes et al., 1999; d'Acremont & Van der Linden, 2006; Rowe et al., 2004). Gender roles can be defined as expectations about behavior that are generated by the social group and depend upon the gender group to which the individual belongs (Basow, 1992). In line with this, studies on parental behavior have shown that boys and girls are treated differently by their parents at a very early age (Fagot, 1995). Girls are encouraged to be nurturing and polite. In contrast, boys are encouraged to be autonomous, adventuresome and independent (Huston, 1983; Pomerantz & Ruble, 1998; Zahn-Waxler et al., 1991). Gender-role socialization is based on gender stereotypes, which can be defined as the set of beliefs about what it means to be a male or a female in terms of physical appearance, attitudes, interests, psychological traits, social relationships, and occupations (Ashmore et al., 1986; Deaux & Lewis, 1984). In particular, gender stereotypes about risk-taking characterize it as a typically masculine type of behavior (Bem, 1981; Morrongiello & Hogg, 2004). This interpretation is consistent with gender norms about risk-taking (Yagil, 1998). For example, by the age of 6, children already have differential

beliefs about injury vulnerability for boys and girls. Children rate girls as having a greater risk of injury than boys, although boys routinely experience more injuries than girls (Morrongiello et al., 2000). Among adolescents, drinking and driving is seen to be more acceptable for boys than for girls (Rienzi et al., 1996), and males are subject to less supervision than females (Parker et al., 1992). However, complying with certain male-stereotyped traits does not mean complying with all the components of masculinity, or even not complying with certain feminine traits (Bem, 1974, 1981). Accordingly, conformity to gender stereotypes can provide an explanation for both inter-group and intra-group differences in involvement in injury-risk behaviors. It was not until recently studies have demonstrated the impact of gender stereotypes on risk-taking, driving style, and road accidents among adolescents and adults (Granié, 2009; Özkan & Lajunen, 2006; Raithel, 2003), gender stereotype conformity appearing as a better predictor of risk-taking than age or sex.

However, the role of gender stereotypes in children's injury-risk behavior is not well known. Past research suggest that parents display a differential treatment of injury-risk behaviors according to the child's sex (Morrongiello & Dawber, 1999; Morrongiello & Dawber, 2000), and research has also shown that boys engage in riskier behaviors than girls even as toddlers and preschoolers (Hillier & Morrongiello, 1998; Morrongiello et al., 2000). To fully understand how gender differences emerge in injury-risk behaviors, it is critical that gender-role development in risk-taking be examined.

Under social pressure, individuals have a tendency to build their identity as gendered beings by positioning themselves with respect to gender stereotypes. Research based on social-cognitive theories of gender development (Bussey & Bandura, 1999) shows that children act with respect to gender-linked stereotypes before fully knowing the gender stereotypes. From external pressure

and sanctions, the regulation of behaviors shifts to internal sanctions based on personal standards. Thus, while 3-year-old children behave in a gender stereotypic manner to peers' cross-gender typed behavior but do not regulate their own behavior, 4-year-old children display self-regulatory guidance based on personal standards (Bussey & Bandura, 1992).

Along these lines, the goal of this study was to detect the differential effects of male and female gender-stereotype conformity on risk-taking in preschoolers. Differential socialization starting at a very young age, along with the influence of gender roles on risk-taking, suggests that observable differences among children can be partly explained by compliance with social pressures dictating stereotype adherence. Differing conformity to gender stereotypes thus allows us to predict sex differences in risk-taking. In line with the few earlier studies (Granié, 2009; Özkan & Lajunen, 2006; Raithel, 2003), we predict that male gender-role conformity as specified by the parents has an effect on injury-risk behaviors as specified by the parents among preschool children, not only boys but also girls. And, in line with social cognitive theories of gender-role development (Bussey & Bandura, 1999), we predict that sex differences in preschoolers' risk-taking will increase with age as boys' conformity to gender-linked stereotypes increases.

2. Methods

2.1 Participants and procedure

The participants were 170 preschool children (89 boys and 81 girls) from the same suburb of Paris (France). For studying the age effect on the relationship between risky behaviors and gender stereotype conformity, four age groups were selected: 3-year-olds, 4-year-olds, 5-year-

olds and 6-year-olds. The sample size, the age mean and standard deviation, and the number of boys and girls in each group are summarized in table 1.

------ Insert table 1 here -------

The 170 parents who answered the questionnaires (16 men and 154 women) were between 25 and 54 years old (*M* = 36.19, *SD* = 5.11). Parent's age is comprised between 30 and 39 years-old for 64% of the sample. Eighty two per cent of the children live in two-parent families and 65% have at least one sibling. Nearly 89% of the parents are native to Europe. With regard to parent education, 73% of the respondents have at least high school education and 50% of the respondents are white-collar workers. The parents' nationality and age, socio-economic factors, family structure and siblings' presence were controlled to be equally distributed in each child age and sex group.

Parents with young children were approached in public parks and asked to complete the Injury Behavior Checklist (IBC), the Pre-School Activities Inventory (PSAI) and the Bem Sex Role Inventory (BSRI). Other questionnaire measurements were also completed but will not be reported herein. Parents were asked to fill out the questionnaire at home through the week after it was distributed and to send it by mail to the author once completed. The questionnaires were anonymous and 85% of the questionnaires distributed have been completed and sending back by the parents.

2.2 Tools

Conformity to gender stereotypes in preschool children was assessed indirectly on a psychometric instrument called the Pre-School Activities Inventory (PSAI). Children's injury risk behaviors have been measured indirectly thanks to Injury Behavior Checklist (IBC). Parents'

gender stereotype conformity has been estimated with the Bem Sex Role Inventory (BSRI). PSAI and IBC scales were translated into French and tested by the author.

Risk-Taking Behavior in Preschool Children: Injury Behavior Checklist (IBC). The IBC is a checklist of injury risk behaviors for use with the parents of the concerned children. It has proven reliable for predicting accidents in preschoolers (Speltz et al., 1990) and 6-to-9-year-olds (Potts et al., 1995; Potts et al., 1997) and is correlated with actual risk-taking among children (Potts et al., 1995; Potts et al., 1997). The checklist has 24 items describing potentially accident-provoking behaviors (e.g. climbing on furniture, going outside without permission, running in the street). Parents had to rate the frequency of each behavior over the past six months on a five-point scale ranging from 0 (never) to 4 (very often, i.e., more than once a week).

Gender Stereotype Conformity in Preschool Children: Pre-School Activities Inventory (PSAI). The PSAI was developed by Golombok and Rust (1993a, 1993b). This tool was designed for use with parents of children ages 3 to 7, in view of assessing gender-role behaviors. The questionnaire has been validated in a group of preschool English children (n = 102). Additionally, stability (test–retest reliability) was examined for 5500 children between 2.5 and 8 years-old (Golombok et al., 2008). Stability coefficients demonstrate high stability over time, for boys and girls. The PSAI has been assessed in various cohorts for standardization and norming purposes. These cohorts include normal preschool children across several samples in the United Kingdom (n = 1,820), in the United States (n = 203), and also in the Netherlands, using a Dutch translation of the questionnaire (n = 341). Furthermore, the responses of parents and teachers are well correlated (Golombok & Rust, 1993a). The PSAI measures intragroup differences among boys and girls in terms of their "masculinity" and "femininity" (Golombok & Rust, 1993a, 1993b). It has been applied in studies aimed at grasping the determinants of gender-typed

behaviors, both in hormonal terms (Hines et al., 2004; Hines et al., 2003) and in genetic and environmental terms (Iervolino et al., 2005).

The PSAI is composed of 24 items: 12 related to male stereotypes and 12 related to female stereotypes. It has three scales: a 7-item toy scale with 4 "masculine" items (e.g. swords or objects used like swords) and 3 "feminine" items (e.g. jewelry or objects used as jewelry); an 11-item activity scale with 5 "masculine" items (e.g. fighting) and 6 "feminine" items (e.g. playing house); and a 6-item trait scale with 3 "masculine" items (e.g. enjoying rough play such as jumping, yelling, hitting, etc.) and 3 "feminine" items (e.g. not liking to get dirty). Parents had to estimate how often within the last month their child had used that type of toy, engaged in that type of activity, and exhibited each trait, on a scale ranging from 1 (never) to 5 (very often). The masculinity scale of the PSAI includes items which are obviously related to injury risk and very similar to some items of the IBC: “fighting”, “climbing”, “likes to explore new surrounding”, “enjoys rough and tumble play”. To avoid measuring injury-prone behaviors through the PSAI scale, these 4 items were deleted for the masculine scale. Thereby, before tool validation, the masculine PSAI subscale was made up of 8 items and the feminine PSAI subscale was made up of 12 items.

Parents’ gender-stereotype conformity: Bem Sex Role Inventory (BSRI). For controlling effect of parents’ gender stereotype conformity on PSAI and IBC scores, parents completed a measurement of their own gender-stereotype conformity. This measurement is based on both French translations of the Bem Sex Role Inventory (Bem, 1981) validated for adolescents (Fontayne et al., 2000) and adults (Gana, 1995). This measurement is composed of 33 personality traits, 12 masculine-stereotyped traits, 11 feminine-stereotyped traits and 10 neutral

traits presented alternately. Parents have to say to what extent each trait reflects his/her character from 1 = this is never true to 7 = it is always true.

3. Results

3.1 Tool Validation

PSAI with orthogonal Varimax solution explained 47.7 % of the total variance, before removal of two feminine items, with the two following identified factors with eigenvalue < 1: feminine factors contributing to 37.1 % of the total variance; masculine 10.6 %. Eighteen items on 20 were intended to assess a particular trigger subscale loaded on the corresponding subscale with factor loadings of > .41. Nevertheless, two feminine items with factor loadings of < .40 ("not liking to get dirty" and "not taking risks", from the PSAI trait scale) were not included in the final femininity score. The principal component analysis with Varimax rotation after removal of these two feminine items accounted for 52.4 % of the total variance. The masculinity scale ended up with 8 items and the femininity scale, 10 items. Cronbach's alphas for these final scales were α = .81 for the masculinity score and α = .86 for the femininity score.

Given that the goal of this study was to detect differential effects of male and female gender stereotype conformity on risk-taking, the masculinity and femininity scores were kept separate instead of being combined into a single score measuring masculinity, as recommended by Golombok and Rust (1993a, 1993b). This prevented any loss of information. We used these two scores directly (Özkan & Lajunen, 2006) rather than evaluating gender category membership (Bem, 1974, 1981). The PSAI masculinity score was between 19 and 40 for boys and between 8

and 30 for girls. The PSAI femininity score ranged from 6 to 50 for boys and from 21 to 50 for girls.

BSRI with orthogonal Varimax solution explained 32.6 % of the total variance, before removal of 6 items, with the two following identified factors with eigenvalue < 1: masculine factors contributing to 21 % of the total variance; feminine 11.6 %. Seventeen items on 23 were intended to assess a particular trigger subscale loaded on the corresponding subscale with factor loadings of > .40. Nevertheless, 3 feminine items (affectionate, like to take care of children, soft-spoken) and 3 masculine items (willing to take risks, like sports, defend own beliefs) with factor loadings of < .40 were not included in the final femininity and masculinity scores. The principal component analysis with Varimax rotation after removal of these 3 feminine and 3 masculine items accounted for 38.5 % of the total variance. The masculinity scale ended up with 9 items and the femininity scale, 8 items. As for the PSAI score, we used the masculinity and the femininity scores directly (Özkan & Lajunen, 2006) rather than evaluating gender-category membership (Bem, 1974, 1981). Cronbach's alphas for the final scales were α = .79 for the masculinity scale and α = .71 for the femininity scale.

For the IBC scale, Cronbach's alpha (α = .83) allowed us to consider this child risk-taking scale as homogeneous.

3.2 Age and Sex Effects on Conformity to Gender Stereotypes

First, we checked the parents' masculinity and femininity effects on the masculinity and femininity they assigned to their child.

Partial correlations have been made on links between parental gender stereotype conformity (BSRI) and the gender stereotype conformity they assigned to their child (PSAI) for each child

sex, after controlling parent's sex effect. They show significant positive correlation between the parent's masculinity score and the boys' femininity score (pr = .22, n = 84, p < .05) and between the parent's masculinity score and the girls' masculinity score (pr = .34, n = 77, p < .01). Thus, parents' masculinity levels tend to increase the cross-gender stereotype conformity they assigned to their children.

------ Insert table 2 here -------

Table 2 shows means and standard deviations for masculinity and femininity scores for boys and girls for each age group. MANOVA calculated on the effects of age (4) and sex (2) on child's masculinity and femininity scores on PSAI shows there was a significant effect of the child's age (F (6,318) = 1.85, p < .05; Wilks' Lambda: λ = .93, partial eta squared = .03) and sex (F (2,159) = 270.68, p < .0005; Wilks' Lambda: λ = .23, partial eta squared = .77) on the combined dependent variable of the child's gender stereotype conformity. Analysis of each individual dependent variable, using a Bonferroni adjusted alpha level of .025, showed that there was no contribution of age to femininity scores (F (3,160) < 1). Age groups differ in terms of masculinity scores (F (3,160) = 3.41, p < .025). Post-hoc Bonferroni tests showed that 3-year-olds' masculinity scores were significantly higher (p < .05) than those of 5- and 6-year-olds. Girls and boys differed in terms of masculinity scores (F (1,160) = 188.79, p < .0005) and in terms of femininity scores (F (1,160) = 269.45, p < .0005). There is no significant interaction effect between the factor of the child's age and the factor of the child's sex on the child's gender stereotype conformity (F (6,318) = 1.45, ns).

In order to provide a better understanding of masculinity decrease with age, MANOVAs were calculated, for girls and boys separately, on the effects of the child's age (4 categories) on masculinity and femininity scores on PSAI. MANOVAs show no significant effect of age on the

combined dependent variable of boys' gender stereotype conformity (F (6,164) < 1, ns; Wilks' Lambda: λ = .95, partial eta squared = .23), but show a significant effect of age on the combined dependent variable of girls' gender stereotype conformity (F (6,152) = 2.57, p < .05; Wilks' Lambda: λ = .82, partial eta squared = .09). Analysis of each individual dependent variable, using a Bonferroni adjusted alpha level of .025, showed that there was no contribution of age to girls' femininity scores (F (3,77) = 1.02, ns). Girls' age groups differ in terms of masculinity scores (F (3,77) = 3.74, p < .025). Post-hoc Bonferroni tests showed that masculinity scores for 3-years-old girls were significantly higher (p < .05) than for 6-years-old girls.

Thus, girls have a higher femininity score on the PSAI than boys, boys have a higher masculinity score on the PSAI than girls, and girls' masculinity scores decrease with age.

3.3 Age and Sex Effects on the Risk-Taking Behaviors

------ Insert table 3 here -------

Table 3 shows means and standard deviation for IBC score for boys and girls for each age group. The ANOVA on the effects of children's age group (4) and sex (2) on risk-taking score on IBC yielded significant effects, for both the children's sex (F (1,159) = 8.34, p < .01) and age (F (1,159) = 5.11, p < .01). Post-hoc Bonferroni tests showed that the 3- to 5-year-olds had comparable risk-taking scores, but their scores were significantly higher (p < .05) than those of the 6-year-olds. Boys scored significantly higher than girls on the IBC. There is no significant interaction effect between the factor of children's age and the factor of children's sex on IBC scores (F (3,159) < 1, ns).

Thus, sex and age affected risk-taking: the girls and the oldest children exhibited fewer injury-risk behaviors than did the boys and the youngest children.

3.4 Predictive Models of Risk-Taking

Separate hierarchical regression analyses were conducted on the total sample and on the boys' and girls' samples separately, with IBC score as dependent variables and as predictors for the age group (3, 4, 5, 6-year-olds), BSRI scores (masculinity and femininity scores) and PSAI scores (masculinity and femininity scores). For the regression analysis on the total sample, the children's sex (with boy = 1 and girl = 0) was added to the model. For each analysis, all the predictor variables were entered using backward method.

For the total sample, a significant model emerged, F (3, 162) = 24.30, $p < .0001$. It explained 29.8 % of the variance. The children's masculinity score ($t = 7.84$, $p < .0001$) and femininity score ($t = 3.31$, $p < .001$) only contributed to the model. Beta standardized coefficients showed that masculinity score ($\beta = .61$) was more discriminatory than femininity score ($\beta = .25$) to predict IBC score. Neither the children's sex nor their age, nor the parents' masculinity and femininity scores were predictors of the IBC score on the total sample.

For the boys, the model obtained (backward method) was significant (F (1, 84) = 41.94, $p < .0001$). The masculinity score participated in predicting the IBC score for boys ($\beta = .58$, $t = 6.48$, $p < .0001$); age, the children's femininity score and the parents' masculinity and femininity scores were not predictors. Thus, the final model for the boys' IBC score included only the masculinity scores and accounted for 32.5 % of the variance.

For the girls, the model obtained (backward method) was significant (F (1, 78) = 16.12, $p < .0001$). The children's masculinity score ($\beta = .41$, $t = 4.01$, $p < .0001$) only helped predict the girls' IBC scores and contributed 16% to the explained variance; the parents' masculinity and femininity scores and children's femininity score were not predictors of the girls' risk-taking.

Thus, even though for the total sample IBC score was predicted by child's masculinity score and to a lesser degree by child's femininity score, the injury-risk behaviors of boys and girls were predicted solely by conformity to male stereotypes: displaying frequent masculine behaviors is a predictor of a child's higher injury-risk behavior.

4. Discussion and conclusion

The aim of this study was to demonstrate the effects of conformity to gender stereotypes on injury-risk behaviors among preschool children. The results indicated that gender-stereotype conformity did indeed affect risk-taking among these preschool children. The initial hypothesis of an effect of male gender-role conformity as specified by the parents on injury-risk behaviors as specified by the parents, was confirmed among preschool children, not only boys but also girls. More specifically, masculine stereotype conformity turns out to be a better predictor of risky behaviors than biological sex, thus confirming among preschoolers other research carried out on adolescents (Granié, 2009; Raithel, 2003). Conformity to gender stereotypes can explain why males and females differ in risk-taking, but, in other respects, can also help to understand differences in male groups and female groups in risk-taking. Being a boy or a girl does not predict the self-reported level of injury-risk behaviors. Rather, being recognized as masculine, i.e. being seen by their parents as strongly adopting behaviors and personality traits that society attributes to the male sex, predicts risky behaviors in preschoolers, whatever the child's sex. Then, it is not to say that male activities – i.e. activities actually produced by boys and men – are more risky than female ones. Rather, it seems that masculine activities – i.e. activities socially

expected from boys and men – are generally more risky than feminine ones. Therefore, over-representation of boys in unintentional injuries may also be due to risky behaviors that social groups expect from boys, to assert their masculinity.

The results also showed that injury-risk behaviors, as measured by the IBC, decreased with age: the initial hypothesis of the study of an increase with age of sex differences in preschoolers' risk-taking was not supported and boys' conformity to gender-linked stereotypes does not increase with age. In this respect, our findings are still consistent with the literature (Speltz, Gonzales, Sulzbacher, & Quan, 1990). Some researchers have ascribed this effect to the tool itself, which may not allow parents of older children to identify all the risk-taking behaviors of their child, particularly when the child is at school (Morrongiello & Matheis, 2007). Age-related changes in children's injury-risk behaviors could also be related to the degree of masculinity the child exhibits, and girls less and less adhere to masculine stereotypes as they grow older. These gender-role changes with age were also noted by Golombok and Rust (1993a, 1993b) using the same measurement of gender-stereotype conformity.

However, the results of the present study revealed that stereotype rigidity manifests itself among girls not by an increase in stereotypical activities but mainly by a reduction in counter-stereotyped activities. Results among girls of this study are consistent with the literature, which emphasizes that by the age of 4, most children begin to avoid activities of the opposite gender and gradually focus on activities considered appropriate for their gender group (Ruble & Martin, 1998). At the age of five, children become prototypes of their gender group, and parents may become disconcerted and become to believe that sex differences are more biological than sociocultural (Dafflon-Novelle, 2005). Other studies have reported that rigidity with respect to gender stereotypes is the strongest between the ages of 5 and 7, with gender-role violations being

judged just as unacceptable as moral transgressions (Ruble & Stangor, 1986). A longitudinal study could make it possible to observe the effects of gender-role development on injury-risk behaviors among schoolchildren and adolescents (Granié, 2009).

Lowered conformity to masculine ways and lowered injury-risk behaviors among girls, as seen in the present study, can also be explained by sex segregation among children (Serbin et al., 1993). According to Maccoby (1988), the desire to avoid the opposite sex rests mainly on the greater compatibility of behavior styles among same-sex children, which sets in at a very early age. Sex-based segregation thus provides less opportunity for girls to play with boys, and as a consequence there is (1) less display of masculine behaviors among girls and (2) fewer dangerous or risky behaviors, as the results of this study show. But gender stereotypes and sex-differentiated socialization mean that girls are discouraged from being rowdy, whereas boys are encouraged to be rowdy, in such a way that the different behavioral styles adopted by girls and boys can, in an indirect way, be socially dictated as well.

Compared to girls, boys are more strongly discouraged by people in their social circle from engaging in activities that go against the stereotype (Jacklin et al., 1984; Maccoby & Jacklin, 1974; Muller & Goldberg, 1980), and they are more subjected to — and aware of — this social pressure (Bussey & Bandura, 1992; Fagot et al., 1986). Accordingly, activities that defy stereotypes are perceived more negatively for boys than for girls, and this reinforces "masculine" activities and curbs "feminine" ones among boys (Bussey & Bandura, 1999; Raag, 1999).

The results of this study confirm that the male-female difference in risk-taking may in part be attributed to the gender role defining the behavior expected from boys and men in Western societies (Byrnes et al., 1999; d'Acremont & Van der Linden, 2006; Rowe et al., 2004). Research has shown that parental beliefs have an impact on child-rearing practices regarding risk: the risky

behavior of boys is considered innate and unchangeable by education, whereas risk prevention is the main focus in raising girls (Hagan & Kuebli, 2007; Morrongiello & Dawber, 1999; Morrongiello & Hogg, 2004). These results show at least a relationship between children's risk-taking and parental preconceptions of masculine and feminine gender roles and may shed new light on differential socialization for risks (Hagan & Kuebli, 2007; Morrongiello & Dawber, 1999; Morrongiello & Hogg, 2004).

Thus, conformity to gender stereotypes — and the differential child-raising practices of parents who enable it but who also use it as a basis for parenting — could account for the results of this study.

These findings, which need to be confirmed in future research, could have important repercussions in terms of risk education policies. The role of parental socialization should be investigated in this relationship. Indeed, the literature shows parents who espouse traditional gender orientations actively encourage and reward traditional gender-linked activities and pursuits in their sons and daughters (Fagot et al., 1992; Katz, 1996; Owen Blakemore, 1998, 2003). On the contrary, repeated symbolic modeling of egalitarian role pursuits by males and females enduringly reduces gender role stereotyping in young children (Ochman, 1996; Serbin et al., 1993; Thompson & Zerbinos, 1997). Thus, research on parental socialization practices may take into account parental gender role orientation for a better understanding of the differential socialization of boys' and girls' injury-risk behaviors.

4.1 Practical implications

These results improve our knowledge of the mechanisms which explain sex differences in risk-taking. They confirm that these differences are not only innate tendencies but are also due to

gender-role development and social pressures. This knowledge could have practical implications. Thus, faced with these sex differences in risk-taking, a twofold response may be given: differentiation in risk education should be increased for adolescents, and reduced for preschoolers.

The present study showed that injury-risk behaviors increased as a function of masculinity for boys and girls. Sex differences in risk-taking do not arise from innate temperamental differences between sexes. Rather, gender is a social and cultural construct and gender stereotypes contents reflect perceivers' observations of men's and women's daily life behaviors (Eagly, 1987). This could be used to change the relationship between children's gender roles and risky behaviors through risk education and media campaigns. In this way, some of the feminine characteristics, which were found to be related to more careful behaviors among adolescents (Granié, 2009), might also be attached to masculine characteristics of role models. Risk education for male adolescents can thus use examples of the numerous male models who do not match with gender stereotypes about risk taking while being socially recognized as masculine. Role models play a double function of information on gender stereotype (acquisition) and of behavior production (adoption) (Bussey & Bandura, 1999). In risk education, use of feminine characteristics by masculine role models could lead acquisition of modified gender stereotypes and adoption of less risky behaviors among adolescent males. In comparison, Medias' insistence on males' risk-taking can unfortunately strengthen adolescents' and parents' stereotypic beliefs, and therefore reinforce psychological essentialism (Heyman & Giles, 2006) and differential socialization about risk-taking between boys and girls.

For preschool children, injury prevention should be based on a less differentiated risk education. Virtually all the children's socialization agents (parents, peers, school, media) have different

expectations and behaviors depending on the children's sex (Bussey & Bandura, 1999). And this differentiated socialization has an effect on children's behavior: children's preferences for gendered activities emerge before they know the gender linkage of such activities (Blackemore et al., 1979; Martin, 1993; Perry et al., 1984; Weinraub et al., 1984). Thus, socialization agents should be sensitized to their role in building sex differences in injury risk, before acting on individuals in a sex-differentiated way to prevent risky behaviors.

4.2 Limitations of this Study

The main limitation of this study is that data on children's gender-stereotype conformity and injury-risk behaviors are not directly observed but are based on a parental reading of children's behaviors for these two dimensions. These standardized reported measurements have been found to correlate with actual injuries and risk-taking in children (Potts et al., 1995; Potts et al., 1997; Speltz et al., 1990) and with other measurements of gender-stereotype conformity (Golombok & Rust, 1993a, 1993b). Nevertheless, it is obviously essential to observe both injury-risk behaviors (Morrongiello, 2004; Morrongiello & Matheis, 2007) and gender-stereotype conformity in children (Connor & Serbin, 1977; Serbin & Sprafkin, 1986; Serbin et al., 1993) either by direct measurements on a smaller sample or by indirect information provided by significant others (not just the parents). In both cases, the sources of information for injury-risk behaviors and gender-stereotype measurements would not be the same, making it possible to address the central question to this area of research: do boys engage in injury-prone behaviors to affirm their masculinity, or are they seen as more masculine because they display injury-risk behaviors?

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Table 1

Sample size, mean age (in months), standard deviation and number of boys and girls in each age group

Age group	N	Mean age (in months)	Standard deviation	Boys	Girls
3	44	42.14	3.08	27	17
4	45	51.11	2.35	23	22
5	45	62.31	4.04	22	23
6	36	73.17	2.20	17	19

Table 2

Mean (standard deviation) of masculinity and femininity scores for boys' (N = 89), girls' (N = 81) and total (N = 170) samples for each age group

		3 year-olds	4 year-olds	5 year-olds	6 year-olds	Total
Masculinity	Boys	27.54 (5.15)	27.56 (4.14)	26.76 (5.82)	25.94 (4.29)	27.05 (4.88)
	Girls	19.29 (6.24)	16.82 (5.22)	16.00 (4.00)	14.00 (3.57)	16.44 (5.04)
	Total	24.28 (6.87)	22.31 (7.16)	21.14 (7.31)	19.64 (7.18)	21.93 (7.26)
Femininity	Boys	23.81 (7.35)	22.26 (7.06)	21.33 (5.52)	20.71 (5.89)	22.19 (6.59)
	Girls	37.12 (8.23)	40.64 (5.04)	40.04 (6.41)	38.68 (7.49)	39.27 (6.77)
	Total	29.07 (10.06)	31.24 (11.10)	31.11 (11.16)	30.19 (11.29)	30.43 (10.84)

Table 3

Mean (standard deviation) of IBC score for boys' (N = 89), girls' (N = 81) and total (N = 170) samples for each age group

		3 year-olds	4 year-olds	5 year-olds	6 year-olds	Total
IBC score	Boys	23.52 (11.05)	23.52 (10.99)	22.52 (11.81)	16.76 (7.05)	21.94 (10.71)
	Girls	19.00 (8.82)	20.23 (9.83)	18.13 (8.26)	11.58 (6.76)	17.35 (8.99)
	Total	21.69 (10.34)	21.91 (10.45)	20.23 (10.24)	14.03 (7.29)	19.71 (10.15)