Journal of Adolescent Health 55 (2014) 373–379

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Original article

Masculine Boys, Feminine Girls, and Cancer Risk Behaviors: An 11-Year Longitudinal Study

Andrea L. Roberts, Ph.D. [a,*], Margaret Rosario, Ph.D. [b], Jerel P. Calzo, Ph.D. [c,d], Heather L. Corliss, Ph.D. [c,d,e], Lindsay Frazier, M.D. [f,g], and S. Bryn Austin, Sc.D. [a,c,d,e]

[a] *Department of Social and Behavioral Sciences, Harvard School of Public Health, Boston, Massachusetts*
[b] *Department of Psychology, City College of New York|City University of New York Graduate Center, New York, New York*
[c] *Division of Adolescent/Young Adult Medicine, Boston Children's Hospital, Boston, Massachusetts*
[d] *Department of Pediatrics, Harvard Medical School, Boston, Massachusetts*
[e] *The Channing Division of Network Medicine, Brigham and Women's Hospital, Boston, Massachusetts*
[f] *Dana-Farber Cancer Institute, The Harvard Medical School, Boston, Massachusetts*
[g] *Department of Epidemiology, Harvard School of Public Health, Boston, Massachusetts*

Article history: Received August 29, 2013; Accepted February 19, 2014
Keywords: Masculinity; Femininity; Cigarette smoking; Cigar smoking; Chewing tobacco; Physical activity; Tanning; Cancer

A B S T R A C T

Objective: Cancer risk behaviors often begin in adolescence and persist through adulthood. Tobacco use, indoor tanning, and physical inactivity are highly prevalent, socially patterned cancer risk behaviors, and their prevalence differs strongly by sex. It is therefore possible that these behaviors also differ by gender expression within the sexes due to social patterning.
Methods: We examined whether five cancer risk behaviors differed by childhood gender expression within the sexes and whether patterns of media engagement (e.g., magazine readership and trying to look like media personalities) explained possible differences, in a U.S. population–based cohort (N = 9,435).
Results: The most feminine girls had higher prevalence of indoor tanning (prevalence risk ratio [pRR] = 1.32, 95% confidence interval [CI] = 1.23–1.42) and physical inactivity (pRR = 1.16, 95% CI = 1.01–1.34) and lower prevalence of worse smoking trajectory (prevalence odds ratio = .75, 95% CI = .65–.88) and smoking cigars (pRR = .61, 95% CI = .47–.79) compared with least feminine girls. Media engagement accounted for part of the higher prevalence of indoor tanning. The most masculine boys were more likely to chew tobacco (pRR = 1.78, 95% CI = 1.14–2.79) and smoke cigars (pRR = 1.55, 95% CI = 1.17–2.06) but less likely to follow a worse smoking trajectory (prevalence odds ratio = .69, 95% CI = .55–.87) and be physically inactive (pRR = .54, 95% CI = .43–.69) compared with least masculine boys.
Conclusions: We found some strong differences in patterns of cancer risk behaviors by gender expression within the sexes. Prevention efforts that challenge the "masculinity" of smoking cigarettes and cigars and chewing tobacco and the "femininity" of indoor tanning to reduce their appeal to adolescents should be explored.

IMPLICATIONS AND CONTRIBUTION

It is unknown whether cancer risk behaviors differ by gender expression within the sexes. This study found that masculine boys and feminine girls had substantially higher prevalence of some risk behaviors compared with gender-nonconforming adolescents. Prevention efforts challenging the "masculinity" and "femininity" of risk behaviors may reduce their appeal to adolescents.

Tobacco use, indoor tanning, and physical inactivity are risk behaviors for cancer that are highly prevalent among U.S. adolescents and young adults. These risk behaviors differ strongly by sex. Nationally, substantially more young men than young women smoke: 28% of men versus 16% of women aged

Conflicts of Interest: The authors have no conflicts of interest or financial disclosures to report.

* Address correspondence to: Andrea L. Roberts, Ph.D., Department of Social and Behavioral Sciences, Harvard School of Public Health, Landmark Building 111 WS 24, 401 Park Drive, Boston, MA 02115.
E-mail address: aroberts@hsph.harvard.edu (A.L. Roberts).

1054-139X/$ – see front matter
http://dx.doi.org/10.1016/j.jadohealth.2014.02.020

18–24 years are current smokers [1]. Use of chewing tobacco and cigar smoking are also more prevalent in males [2], whereas indoor tanning [3] and physical inactivity are more prevalent in females [4–6].

Sex differences in socially influenced risk behaviors are likely to in part reflect underlying gender processes, which may also lead to differences in risk behaviors by gender expression within the sexes. Research in this emerging area has found differences by gender expression in disordered eating [7,8], body-shape concerns [9], and problem drinking [8]. However, it is unknown whether differences in cancer risk behaviors by gender expression exist within the sexes, in other words, whether masculine versus feminine boys have higher prevalence of risk behaviors more common in males and whether feminine versus masculine girls have higher prevalence of risk behaviors more common in females. Children who do not conform to the norms for their biological sex in terms of style of play, appearance, and friendships may be less likely to adopt risk behaviors typical for their sex. Similarly, children who do not conform to gender norms for their sex may be more likely to adopt risk behaviors more typical of the other sex, compared with gender-conforming children.

Media may play an important role in the perception of certain cancer risk behaviors as masculine or feminine. For example, in the past decade, magazine advertisements for chewing tobacco have targeted males and have succeeded in increasing chewing tobacco use among men [10]. Similarly, indoor tanning advertisements are targeted at adolescent girls and young women, purporting to improve sexual appeal, attractiveness, fitness, and mood [11]. Media exposure has been associated with adoption of cancer risk behaviors in adolescents [12–15]. Therefore, exposure to media may partly explain associations between childhood gender expression and cancer risk behaviors. Better understanding of differences in cancer risk behaviors within sexes by gender expression and the role media may play in creating these differences could improve the content and targeting of prevention efforts. However, to our knowledge, no studies have examined the prevalence of cancer risk behaviors in adolescence and young adults by gender expression in childhood, nor have they examined the role of media use in possible differences in prevalence of cancer risk behaviors by gender expression.

In the present study, we assess the relationship between childhood gender expression and five cancer risk behaviors across adolescence and early adulthood in the Growing Up Today Study, a longitudinal cohort of adolescents followed into adulthood. We examine risk behaviors in three domains: physical inactivity, indoor tanning, and tobacco use, including cigarette, cigar, and chewing tobacco use. Furthermore, we explore the contribution of media use to possible behavior differences.

We hypothesize that the most masculine boys will be more likely to engage in behaviors more prevalent among males, including cigarette, cigar, and chewing tobacco use, and will be less likely to engage in behaviors more prevalent among females, including physical inactivity and indoor tanning, compared with the least masculine boys. Similarly, we hypothesize that the most feminine girls will be more likely to engage in behaviors more prevalent among females, including physical inactivity and indoor tanning, and less likely to engage in behaviors more prevalent among males, including cigarette, cigar and chewing tobacco use, compared with the least feminine girls. We hypothesize that different patterns of involvement with media during adolescence by gender expression will partly account for these differences.

Methods

Sample

The Growing Up Today Study is an ongoing U.S. longitudinal study of children of participants of the Nurses' Health Study II, enrolled in 1996 at the age of 9–14 years and followed annually or biennially. Participants who responded to questions about their childhood gender expression in the 2005 or 2007 waves (collected, respectively, in 2005–2007 and 2007–2009) and who responded to items assessing cancer risk behaviors in any wave were included in our analyses. This research was approved by the Brigham and Women's Hospital Institutional Review Board.

Measures

Childhood gender expression before age 11 was assessed in the 2005 wave with four questions from the Recalled Childhood Gender Identity/Gender Role Questionnaire [16] querying roles taken in pretend play, characters on TV admired or imitated, favorite toys and games, and feelings of masculinity and femininity. In a validation study, the complete measure had excellent discriminant validity by sex, sexual orientation, congenital adrenal hyperplasia, and gender identity disorder [16]. Querying gender expression before age 11 meant that, for most participants, we assessed gender expression occurring before the first risk behaviors were measured. Response options were ranged on a five-point scale from "always women or girls/very 'feminine'" to "always boys or men/'very masculine.'" A gender-expression score was created by taking the mean of responses (Cronbach's alpha = .78). The score was then divided into approximate quartiles, separately for males and females: from least masculine (reference group for males) or least feminine (reference group for females) to most masculine or feminine (Figure 1) [17–19].

Four *cigarette smoking trajectories* incorporating age of onset, age of cessation, and number of cigarettes smoked per week at each age, occurring from ages 12–23, were determined using general growth mixture modeling. Because patterns of smoking trajectories were similar for males and females, an unconditional model with both genders was used to estimate trajectories. Models with two through six class solutions were estimated to determine the optimal number of classes that best fit the data. The best-fitting model comprised four trajectories, which were, in order of lowest to highest risk: nonsmoker, experimenter, late initiator leading to moderate consumption, and early initiator leading to high consumption. Participants were assigned to the trajectory group for which they had the highest posterior probability of membership [20,21]. We refer to the trajectory of early initiation leading to high consumption as the "worst" trajectory and consider each higher-risk trajectory "worse" than lower-risk trajectories (e.g., "experimenter" is worse than "nonsmoker"; "late initiator leading to moderate consumption" is worse than "experimenter" or "nonsmoker"). Past-year *chewing tobacco use* was queried in the 1997, 1998, 1999, and 2001 waves and was coded as any or none. Past-year *cigar smoking* was queried in 2001 and was coded as any or none.

Participation in 14–16 sports (e.g., swimming, soccer, and weight training) was reported in six waves from 1996 to 2007.