Significance of traditional masculinity for the prediction of injuries and accidents in male adolescents

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This dissertation was made at the Department for social medicine and health care organization School of Public Health "Andrija Štampar" University of Zagreb School of Medicine and the Department of Health Promotion and Behavior, College of Public Health, University of Georgia, Athens, GA USA.

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I dedicate this work to my parents, brothers, nieces Paula and Ema, and especially to my wife Ksenija and my daughter Nataša Lili.

Contents

LIST OF ABBREVIATIONS

ADHD	Hyperactivity or Attention Deficit Disorder
ANOVA	Analysis of Variance
CAMS	Croatian Adolescent Masculinity Study
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
ESPAD	European School Survey Project on Alcohol and other Drugs
EU	European Union
FAS	Family Affluence Score
GRSP	Gender role strain paradigm
HBSC	Health Behavior in School-aged Children
MRNI-A-R	Male Role Norm Inventory-Adolescent-revised
NPS	New Psychoactive Substances
OR	Odds Ratio
SD	Standard Deviation
SES	Socioeconomic Status
YRBS	Youth Risk Behaviour Survey
US	United States

1. INTRODUCTION AND PURPOSE

The introduction discusses the research background and provides the existing evidence on the topic of the dissertation. It is organized in four sections. The first section explains the theoretical background of traditional masculinity norms. The second section discussess the relation between personal characteristics, environment and safety of adolescents, in the context of injury prevention. The third section examines the problem of health-risk behaviors and injuries among adolescents. The final section provides an overview of the contribution of traditional masculinity norms on health-risk behaviors and injuries of adolescents.

1.1. Traditional masculinity

Gender is a system of social practices, socially constructed distinction between biological sexes, a continuous process in a society that impacts how people see themselves, how they behave and how they view others (1). Masculinity is a concept of internal individual difference, shaped by cultural norms and ideologies exerting its influence through the personalities of individual men and boys (2).

Social cognitive theory of gender development describes how social influences affect the construction of gender ideologies; differentiation of masculinities ideologies might occur as a result of adolescents becoming more aware of gender norms through interactions with family, peers, and the larger society (3, 4).

The golden standard in the research of the psychology of men and masculinities is the gender role strain paradigm (GRSP) (5). Pleck in 1981 wrote the landmark book of this theory, *The Myth of Masculinity* (6), where he described its propositions:

1. *Sex roles are operationalized by sex role stereotypes and norms* (for example, taking risks is normal for boys).
2. *Sex roles are contradictory and inconsistent* (for example, boys are told to "play it tough" and hide emotions to avoid anything feminine, and at the same time are expected to be capable of intimate relationships with girls and show love, warmth and gentleness).
3. *The proportion of individuals who violate sex roles is high* (it is difficult to develop and maintain the characteristics that are prescribed, including superior masculine assertiveness, determination, decisiveness, courage, independence, aggressiveness and stability in the face of stress; thus, the feeling of failure is present).

4. *Violating sex roles leads to social condemnation* (for example, boys are less likely to cry in front of their peers, as it is considered to be feminine, and the peer environment prescribes "tough love" to "straighten out" the person; showing emotions is defined as weakness).
5. *Violating sex roles leads to negative consequences* (a man can feel different the perception of the male role he has, leading to poor psychological adjustment, especially with those who firmly believe in the importance and desirability of the sex roles).
6. *Actual or imagined violation of sex roles leads individuals to over-conform to men* (overcompensating to be closer to own perception of the sex role, for example, by using aggression, drinking excessively, driving carelessly or not showing fear in the face of risk).
7. *Violating sex roles has more severe consequences for males than females* (men possibly perceive the deviance from prescribed sex roles more than women, for not being able to be "real man" and living up to the prescribed sex role).
8. *Certain characteristics prescribed by sex roles are psychologically dysfunctional* (even if men live up to their perception to what it means to be "real men", they suffer from it, leading to specific health problems).
9. *Each sex experiences sex role strain in its paid work and family roles* (for example, fathers spend less time with their children than mothers, boys learn that women need to be more psychologically involved in their families, partially due to seeing economic sustainability as primary responsibility of men).
10. *Historical change causes sex role strain* (men change when the world around them is changed; i.e. men become interested in traditionally female-dominated occupations and vice versa).

This paradigm proposes that sex roles are culturally developed and describes the traditional concept of male sex roles through an interesting factorial conception, developed by Brannon and David in 1976 (7):

1. *No sissy stuff*: anything remotely feminine is stigmatized.

2. *The Big Wheel*: men need to be looked up to, have status and be successful.

3. *The Sturdy Oak*: men need to be tough and self-reliant, the physical standard being a standard of masculine worth.

4. G*ive 'Em Hell:* "the aura of aggression, violence, and daring".

In clarifying the gender role strain paradigm and its impact on health, the authors turned to Pleck's explanation of the types of the strains that men experience. These strains help illustrate the association between traditional masculinity norms and health-risk behaviors, as well as their harmful consequences: discrepancy, dysfunction and trauma strain (8).

Discrepancy strain refers to stress men experience for lacking to embody the male sex role prescription and the effects of this failure on their self-esteem (5)..

Dysfunction strain refers to the "dark side of masculinity" (5, 9), the various behaviors (violence, risky or socially irresponsible behaviors or relationship inadequacies) that develop under as a consequence of the normative socialization of men.

Trauma strain, strongly rooted in social beliefs of biological sex differences supporting the notion that boys are less emotional, refers to normative emotional socialisation of boys, requiring them to conform to the norm of restrictive emotionality; this requirement may lead to deficits in identifying and expressing emotions that reflect vulnerability or attachment, with serious consequences, such as violence, substance use, irresponsible sexual behaviors or estragement from the close people (5).

Levant argued that a common set of standards and expectations is associated with the male role (10) and that traditional masculinity ideology teaches (and forces) boys and men to take on the male role by behaving in a very specific way, otherwise they are sanctioned (11). So when informing the health interventions for boys and men, understanding how the traditional masculinity affects the health behaviors of adolescents would strengthen the interventions.

1.2. Personal characteristics, environment and safety of adolescents

This section examines what is known about how emotional lives of adolescents and their environment influences the patterns of their health behaviors. This section is organized into five areas, which correspond to the second objective: age, impulsivity, depressive mood, socioeconomic status and micro- and macroenvironment.

1.2.1 Age

Most researchers differentiate between age groups or groups, such as children and adolescents. The present study compares adolescent boys from lower and higher grades in high school, examining the effect of grade levels, not only as chronological age, but also the indicator of the microenvironment.

1.2.2. Hyperactivity and impulsivity

Analyzing links between the emotional characteristics of boys and injuries in longitudinal studies, researchers have consistently reported an association between higher incidence of injuries and impulsivity (12, 13). Hyperactivity and impulsivity, as part of the same construct, can be symptoms of Hyperactivity or Attention Deficit Disorder (ADHD), a disorder more prevalent among boys than girls (14). In contrast, hyperactivity and impulsivity could be defined as personal characteristics, if they do not fulfill the criteria for the diagnosis of the disorder. Adolescents, especially boys with ADHD, have a significantly higher risk of depressive mood, depressive episodes and depression and suicide (15, 16), than those without this diagnosis.

Boys may see impulsivity as part of their masculine identity (17) and impulsive behavior could be seen a way to prove their masculinity.

1.2.3. Depressive mood

Depressive mood (referring to the presence of sadness, unhappiness for an unspecified period of time), is common in adolescence (18). Depression is a serious problem among adolescents. Between 5% and 10% of adolescents in the general population present symptoms of depression and the possibility of male adolescents committing suicide is twice of that for their female counterparts (18). Depressive mood can be a symptom depression and be associated with suicidal ideation and suicide (19). The link between depressive mood (and suicidal behavior) and male sex for boys in Croatia merits more investigation.

Ten young people between 15 to 24 years committed suicide in Zagreb in 2015 (20). In the period between 2010 and 2013, the Zagreb emergency medical service had 92 interventions acting on calls related to attempted suicide; more than half (52 of the total 92) of all the interventions were for attempted suicide of adolescents aged 15 to 19 years (21). While suicide attempts are more common among female adolescents, adolescent boys actually die from suicide more frequently than the girls (21).

Most Croatian adolescents are satisfied with their lives: most 16-year-olds in Croatia have a high perception of life satisfaction; 79% of the adolescent males (and 87% adolescent females) aged 16 reported high level of life satisfaction; further on 66% of boys and 77% of girls feeling high level of peer support (22).

1.2.4. Socioeconomic status (SES)

Economic stress increases the anxiety of parents and harms the mental health of their children (23). When examining the SES of youth, researchers commonly use the family affluence measure, because it does not ask for accurate information on their family's finances. Instead, SES is identified through gathering information on the indicators such as number of cars, bathrooms, habits of spending vacation, etc. (24).

2013/2014 HBSC study with European adolescents' sample, using family affluence as a measure of SES, showed that higher family affluence was related to greater self-rated health and life satisfaction, as well as stronger family support, better school performance and peer support (25). The same study demonstrated unclear. Unclear pattern of inequalities in some of the risk behaviors: age of smoking onset, initiation of alcohol use or cannabis use (25). Still, the likelihood that adolescents are healthy, happy and doing well in school becomes significantly and progressively stronger as family affluence rises (25, 26).

When examining adolescents in Croatia, low SES played a protective role against some risk behaviors; according to the analysis of the data from the 2005/2006 HBSC study conducted in Croatia: pupils with high SES presented a higher likelihood of smoking cigarettes, cannabis use and early sexual initiation (27).

Some researchers theorized that men develop a defensive adaptation that exaggerates the traditional male role norms, when facing socioeconomic challenges (28). Identities reflect the systems of power, privilege, oppression and inequity (29) It is yet to be understood how the socioeconomic status influences the embodiment of masculinity among Croatian adolescents.

1.2.5. Microenvironment and macroenvironment

Measuring and addressing economic health inequalities among young people in adolescence is important (22), because of how lives and health outcomes are deeply rooted in the "opportunity structures", that is, the social, economic and organizational factors that influence health (30). As health inequalities are created and then reinforced by multiple social contexts (25), these "opportunity structures" are not limited to economic status (31). Opportunity structures include broader array of inequalities. Thus, the analysis of adolescent boys' risks for injuries should go beyond family SES—employment, education and material wealth of parents (32).The present study includes a multilevel approach, with information on

grade and school type, as a measure of students' microenvironment, and an assessment of the urban or rural location of the school as a measure of the macroenvironment (27) .

Students' school type is another indicator of their school-level socioeconomic environment, or their microenvironment. Some evidence exists on the differences in health-risk behaviors of boys attending different types of school: a studyfrom 2013 showed that students attending industrial and crafts schools were involved in fighting more frequently than pupils from grammar schools (27). Importantly, no research so far has examined how endorsement of gender norms intersect with the prevalence of injuries (and health-risk behaviors potentially leading to them), in specific types of schools.

Students' type of habitat might be associated to their area-level socioeconomic environment, or their macroenvironment. .According to a study with over 600 elementary school pupils from the area in and around Gospić, a city in continental Croatia, the potential influence of the macroenvironment on student's health risks was suggested: children from areas close to the city or from smaller towns experienced most violence, and children from rural surroundings experienced the least violence (33). The results, however, cannot lead to the conclusion that youth who live in rural communities are protected from the effects of violence: youth's exposure to violence is a real concern in many rural communities (34).

1.3. Adolescents, health-risk behaviors and injuries

Theory and research support that problem behaviors tend to cluster and that adolescents involved in one health-risk behavior are likely to be involved in other negative behaviors as well: adolescents involved in one health-risk behavior are probably involved in others (25, 35). Violence and substance use contribute greatly to the burden of disease of adolescents in Croatia (36). This section examines high-risk behaviors of adolescence, particularly alcohol and psychoactive drugs use, fights, weapon carrying and the lack of traffic protection

1.3.1. Alcohol use

Alcohol is associated with injuries. Thus, a study conducted with youth aged 15 to 24 in Zagreb for the period between 2010 and 2013 has shown that large majority of medical interventions are related to alcohol intoxication (21). Alcohol is also associated with other health-risk behaviors including violent behaviors or driving under influence (37).

The proportion of young people consuming alcohol is alarmingly high. Among youth 15 years old, 33% of males and 13% of femalesdrank alcohol at least once a week (25), despite the fact that according to the Croatian law, minors under the age of 18 are prohibited to be sold or served alcohol (37). ESPAD study, conducted with 16-year-olds in Croatia just a few months prior to data collection for the present study, demonstrated that 94% of adolescents boys and 91% girls tried alcohol in their lifetime (38). Adolescent girls in Croatia generally reported less drunkenness than boys (27) but gender differences appear to be decreasing, particularly for drinking and drunkenness multiple times in a week (25).

1.3.2. Psychoactive drug use

Much is known from the existing large-scale research, especially ESPAD, on the habits of adolescents in Croatia in relation to psychoactive drugs. Available evidence show that marihuana is the most dispersed psychoactive substance in Croatia with 21% of adolescents included in the ESPAD study reporting smoking cannabis (38). In that same study, 4% reported using tranquillizers without a prescription and 5% reported using other illicit drugs (such as ecstasy, amphetamine, cocaine, LSD, heroin and other) in their lifetime (38). Adolescents in Croatia are on top of European youngsters in regards to the use of inhalants and new psychoactive substances (NPS - sometimes called “legal highs”, “ethno botanicals” or “research chemicals”, coming to market in different forms like herbal mixtures, powders, crystals or tablets); 25% used inhalants and 7% used NPS in their lifetime (38). While much is known from this study on the habits of adolescents in Croatia in relation to psychoactive drugs, the relation between injuries and psychoactive drugs merits more investigation. More localized data on the use of psychoactive drugs among adolescents is needed for Zagreb.

1.3.3. Fights and weapon carrying

Physical fighting and weapon carrying are two indicators of adolescent violence that are commonly reported by youth, affecting the immediate health of adolescents by increasing the risk from injuries (39). The Health Behavior in School-aged Children survey (HBSC) conducted in 2013/2014 showed that 14% of 15-year-old boys (and 3% girls) have been involved in a physical fight at least three times in the last 12 months. Although Croatia is one of the European countries with more progressive politics in violence prevention (40), violent behaviors are commonly present in schools, rarely excluded from a range of personal difficulties (41). Physical fighting remains a health concern as the most common

manifestation of youth violence (25) and as such may have important implications for morbidity and mortality of youngsters.

The prevalence of carrying a weapon on and outside of the school property in Croatia merits more investigation, including information about the type of weapon carried and the type of wound inflicted. Besides the risk from injuries, carrying a weapon has been associated with poor relationships with parents and negative childhood experiences (42, 43).

1.3.4. Lack of traffic protection

The US Centers for Disease Control and Prevention (CDC) suggests that adolescents are more likely than older drivers to underestimate danger, make critical decision errors that may lead to serious crashes (44). Further, adolescents have low rates of seatbelt use, wearing them mostly when riding with someone else (44). These risky traffic behaviors directly contribute to traffic injuries and fatalities (44).

The risk from transport injuries is a serious problem for adolescents in Zagreb: in 2015, in 164 adolescents were hurt in traffic, according to the city records (20, 45). Transport-related injuries can lead to hospital treatment, lost school days, disabilities, and physical and psychological wounds, with long-term consequences for the young person and substantial financial costs to the family and society (25).

Few effective mechanisms are available for directly influencing teen behavior that could be converted it into effective interventions (46) Research about the potential of utilizing gender transformative programs in traffic injury prevention could not be found in the literature. This niche in this field is especially important for young men, knowing that males are more likely to be involved in road traffic crashes than females (47).

1.4. Unintentional injury events

Unintentional injuries compromise the health of adolescents (48). Every day children and adolescents die from injuries sustained from motor vehicle injuries, drowning, poisoning, falls, burns, and violence, with motor vehicle injuries alone claiming for 10.2 deaths per 100,000 adolescents globally (49). When examining injury deaths of Croatian children aged 14 to 19 years for 2014, traffic-related injuries were most common (13), followed by drowning (2), poisoning (2), murders (1), and falls (1) (50).

According to the HSBC study for 2013/2014, 45% of boys aged 15 years reported having at least one injury that was medically attended, in the 12 months prior to the survey (25). According to hospital data available for 2014 (for Split, the second largest city in Croatia), falls were by far the most common injuries treated in the emergency ward (57%), followed by traffic-related injury events (7%) (51).

Children are especially vulnerable to injuries (52) and even though they rarely result in deaths, most of these deaths are preventable (41). Like elsewhere in Europe, injuries are the leading cause of death and disability of children in Croatia (53). Thus, unintentional injuries (such as injuries from traffic, falls, poisoning, burns, or drowning) are a significant health problem in Croatia (54). Although improving continuously for the last two decades, Croatian adolescent's health is worse than the European average in most parameters including external causes (55).

In the general area of unintentional child injury prevention, levels of child safety could be improved in Croatia (40), as Croatia lags behind the average of EU countries in some aspects of injury prevention (56).

1.5. Masculinity, health-risk behaviors and injuries

Part of growing up for a young man is learning about how being a man means being aggressive, competitive, self-sufficient and emotionally detached and standing out of this "box" of expectations may bring social sanctions and question ones manhood (57). Research suggests a connection between these traditional and 'hegemonic' cultural constructs of masculinity and men's health-risk behaviors, as well as reluctance in seeking health and medical support (58).

Emerging research on boys' psychosocial development concludes that boys have specific vulnerabilities, even though they sometimes appear and are assumed to be less vulnerable than girls in adolescence (59). The causes of morbidity and mortality of young men and young women differ. The intention of this study is not to downplay the suffering of young women, nor debate about which sex is facing more risks but to understand the specific vulnerabilities affecting boys today, as well as to better understand how these interact with the specific vulnerabilities (and needs) of girls (60). Besides biological causes, psychological, social, cultural and political prism needs to be used when considering differences between boys and girls to have a full understanding of gender-specific health and illness (61). Experts are

encouraged to strive to reduce the high rates of problems boys and men face and act out in their lives such as aggression, violence, substance abuse, and suicide (62).

Although injuries are the most common cause of death among all adolescents, male or female, boys are especially at risk: four times more male adolescents die from injuries than females (63). Observing the standardized injury mortality rates by sex from the Child Safety Country Profile from 2012, 8/100000 males adolescents died in comparison to 2/100000 females from intentional and 35/100000 in comparison to 8/100000 from unintentional deaths (64).Violent deaths are the cause of death among men more often than among women, men die earlier, men are several times more likely to develop a mental disease due to alcohol consumption than women, men commit suicide and intentionally harm themselves more often than women (65).

Trajectories of differences in the expression of injury indicators (mortality rate, morbidity and hospitalization) between adolescent males and females are associated with both the exposure and the risk-taking behavior as a result of lifestyle practices, conditioned by defined sex roles. Men are more likely to engage in negative lifestyle practices such as violence or extreme sports, linked with the ideal of toughness, invulnerability, control and the risk-taking (5).

“Human differentiation on the basis of gender is a fundamental phenomenon that affects virtually every aspect of people's daily lives” (4). The decisions the adolescents take regarding their exposure to the health risks, their unhealthy habits, and the issues with their emotional lives are, in the period of adolescence, in a formative way influenced by their environment. The way boys live their lives to “play out” their manhood, may be a contributor to specific health hazards. The present research examined the way the social norms and beliefs around what it means to be a man influence the health of adolescent boys**.**

Men are more likely than women to engage in more than 30 behaviors that increase the risk of disease, injury, and death (66). Although it is known fact that being male is constantly associated with injury and death due to recreation, risk-taking, and violence, not enough is done to question and study men's risk-taking and violence, helping perpetuate the false, broadly accepted, cultural assumption that the risk-taking and violent behaviors are natural for men (66), and that “boys will be boys.”

Psychology of men and masculinities looks at the “protean effects”(5) of gender social norms on the mental health of men, understanding that human evolution offers a biological range of possibilities of how to live lives as men. These do not dictate a fixed type of gender

differentiation in relation to ones' identity. Identity is developed in the interaction with system of influences, prescriptions on how one "should be", in order to be men. The impact of the traditional "system" of masculinities, may affect the conscious and unconscious part of an adolescent men minds, resulting in direct harm on their mental and the physical well-being. Traditional masculinity could be a reason why boys have higher mortality rates, engage in health-risk behaviors more, use substances more and fear the stigma of help-seeking more than their female counterparts.

Young men's views on life, their lifestyles and health-related behaviors are part of a network of gendered relations and structures in the society (58). Their views on what it means to be a man may contribute to their choice of engaging in health-risk behaviors (for instance, alcohol use). These behaviors increase the risk from intentional and unintentional injuries. Harmful notions of masculinity, like the need to use violence, engaging in the risk-taking behavior as a proof of allegience to the male group, the perception of the need to appear tough, increase the (needless) vulnerability of young men and increase their morbidity and mortality (60).

Some evidence suggest that how depression and its symptoms are recognized and reported imply vulnerability, leading to a specific association between the social learning of masculinity norms and reporting of depressive symptoms (5). Could this partially explain the higher prevalence rate for depression among females? Differences in how boys and girls rate their depressive symptoms tend to emerge around the age 11 to 14 (5, 67). Typical, "masked" masculine response to depression includes externalizing (so the behaviors lacking control) like alcohol and substance use (66), anger, impulsiveness or somatic complaints. Because men are considered stronger sex, depression is stigmatized and interpreted as weakness, so social learning on masculinity norms including men's strength, physical and mental, compromises the help-seeking behavior; in the same time, men's difficulty with accessing health services in general, is attributed to a mismatch between services that are available and traditional masculine dimensions, for example, self-reliance end emotional control (2, 5).

Adolescence is the age when young men are under increased pressure to embody the stereotypical dominant male roles regarding their behavior and emotional life. In the same time, it is the age when young men are in under variety of increased risks: general risk-taking behavior, challenges with emotional coping, involvement in violent groups and exposure to violence, sustaining from appropriate health-seeking behavior, tobacco, alcohol and substance abuse, sexual and reproductive health risks, traffic or transit-related injuries and violence (60).

Adolescence is the time when young people try to find themselves in relation to the world; it is a time of change, testing boundaries, experimenting and strengthening norms that will lead them during their lives. Rigid and patriarchal norms around gender and masculinity are important in how young people, especially young men, define themselves as gendered beings, influencing their attitudes, behaviors and relationships with their peers, family members and communities. In the age between 15 and 19, peer pressure increases regarding dominant male roles, social (and sexual) behavior and expression of emotions. This pressure may lead to a variety of risks for this group: tobacco, alcohol and substance abuse, depression and suicide, injury or death from violence, sexual risk-taking behavior, involvement in violent groups, taboos around health-seeking behavior, anxiety of body image and high rates of transport-related injuries (60).

Alcohol intoxication is a common health risk among Zagreb adolescents (21). Drinking alcohol is a gendered activity, where drinking could be a way of coping with sadness or proving "toughness". An interesting qualitative research done with Scottish adolescents suggests that drinking provides a context for boys where discussions of emotions may not be sanctioned as they are in other environments (68).

Further on, when speaking about challenges to boys' health, violence is in many ways a part of becoming a man, the rite of passage. Researchers have consistently found that boys and men report more aggressive behaviors than girls and women, particularly physical and verbal bullying (69). Being violent can assure acceptance in the peer group, by proving allegiance. Children may manifest masculinity through bullying to affirm themselves to their social group (70). In the relation to girls, boys use violence as means of subordination to overcome own challenges with masculinity – boys who themselves feel subordinate among males are associated with the behavior of sexual violence toward girls (71).

Investigating transport safety, boys aged 12–16 years have more risky attitudes than girls of the same age in terms of speed and not wearing a seatbelt, even before they start driving (72). In the same time, while it is a statistical certainty that more males die in traffic than females, boys still attribute negative characteristics to female drivers since an early age (73), reinforcing the notion of dominance, especially over women. Research also shows that men who classify themselves as being *macho* care less about the safety while driving (74), which could be related to the risk-taking dimension of masculinity. In summary, most research point

to the fact that the endorsement of traditional masculinity can be a genuine contributor to hazardous transport behaviors and attitudes of boys in Croatia.

Health-related behaviors are, in part, the way masculinity is acted out (75). Whether it is the reluctance to reveal vulnerability, protecting the notion of honor by using violence, internalization and subsequent repression of emotional response to situations, or a complementary inclination toward risks (76), health interventions aimed at men need to have a masculinities discourse. While the research on the association between masculinity factors and health is growing, more evidence is necessary. Despite a well-documented gender pattern in adolescent health, research investigating possible explanatory factors that contribute to intentional and unintentional injuries of adolescents from a dominant gender-theoretical framework of the gender role strain paradigm for the study context is scarce.

1.6. Problem and purpose

The endorsement of traditional masculinity is an understudied cause of injury, and consequently neglected aspect of injury prevention.. The level of endorsement of the social norms around gender differs among boys. Promising evidence shows that endorsement of masculinity norms can predict negative health behavior (5), however, no evidence exists for the Croatian context.

Boys are more prone to injuries from injuries more than girls. Health-risk behaviors contribute to intentional and unintentional injuries. While much is known on how different behaviors present risk for safety by increasing the risk of injuries and injury-related deaths, little is known on how endorsement of traditional masculinity affects these behaviors.

The examination of the association between traditional masculinity and injuries can open a new venue for prevention. Understanding differences in gender attitudes between adolescents may help understand the potential hazardous effect of traditional masculinity on the health of adolescents in Croatia.

By understanding how environment and personal characteristics of adolescents are related to endorsement of traditional masculinity norms, greater understanding could be achieved of their role in the morbidity and mortality of boys. Environment, personal characteristics and masculinity are braided together in a broader network of identity dimensions. The impact of the intersections of their male identity on the risk from injuries requires more research.

Understanding the impact of norms and beliefs around masculinity on the health of adolescents opens a door to identify the positive approaches based on the gender social norms change in prevention of intentional and unintentional injuries among adolescents. Social constructs related to masculinity in the period between adolescence and adult manhood, require more attention in public health and injury prevention. Although much is known on differences between boys and girls and their susceptibility to injuries, public health is often too gender neutral when diagnosing, treating or managing disease in general (77) and injuries specifically, failing to question gender roles. Well-designed programs approaches that seek to transform gender roles show compelling evidence of leading to change in behavior and attitudes related to health (78).

Examining the function of gender socialization, especially around harmful masculinity, can help understand and highlight the gender-specific risks of boys. By providing critical reflection on harmful aspects of masculinity, an opportunity to challenge violent, inequitable and rigid forms of gender social norms affecting health and well-being of young men is provided. The interplay of gender social norms and health is not reserved for young men only and understanding of the impact of masculinity on health in prevention efforts could have a lifelong effect on improving the lives of adolescents when they transition into adult age as well as inform prevention efforts for adult men.

This study investigated how masculinity norms contribute to health-risk behaviors of adolescent young men, that is, how different modalities of endorsement of masculine norms are associated with negative health outcomes among young men, especially injuries.

Adolescence can be important for laying down the foundations for health trajectories across the life course (36). The most effective actions for adolescent health and well-being lie in sectors beyond health service provision (36). Understanding the endorsement of masculinity norms as a potential health determinant can help in explaining why some young men in Croatia (and elsewhere) face risks and have specific health needs that may not have been considered so far. This means including careful and thorough analysis of how young men are socialized in the causal pathway of injuries.

2. HYPOTHESIS

Expressed attitudes endorsing traditional masculinity norms measured through five dimensions (avoidance of femininity, self-reliance, aggressive dominance, achievement/status and restrictive emotionality) are a significant predictor of behaviors that present risk for safety among high school students from the City of Zagreb aged 16 and 17.

3. OVERALL AND SPECIFIC GOALS

3.1. Goal of the study

The goal of study is to test association between expressed attitudes toward traditional masculinity norms and personal and environmental factors with behaviors that present risk for safety as well as experiences of injuries and accidents among high school students from the City of Zagreb in the age of 16 and 17.

3.2. Specific objectives

1. To analyse the attitudes toward traditional masculinity norms among high school students aged 16 and 17 through five dimensions: avoidance of femininity, self-reliance, aggressive dominance, achievement/status and restrictive emotionality.

2. To investigate the association between attitudes toward traditional masculinity norms among high school students with:

- age
- impulsivity
- depressive mood
- socioeconomic status
- socioeconomic microenvironment and macroenvironment

3. To determine the significance of attitudes toward traditional masculinity norms measured through five dimensions as predictors of behaviors that present risk for safety and accidents and injuries.

4. SAMPLE AND METHODS

4.1. Study design and the sample

The present study had three objectives. The first objective was to analyse the attitudes toward traditional masculinity norms through five dimensions. The second objective was to investigate the association between masculinity and personal and environmental characteristics. The third objective was to determine the significance of masculinity in predicting health risk behaviors. (Figure 1). In the study, the extraneous effects of the environment and personal characteristics were explored through their interplay with the endorsement of traditional masculinity, in potentially contributing to intentional and unintentional injuries.

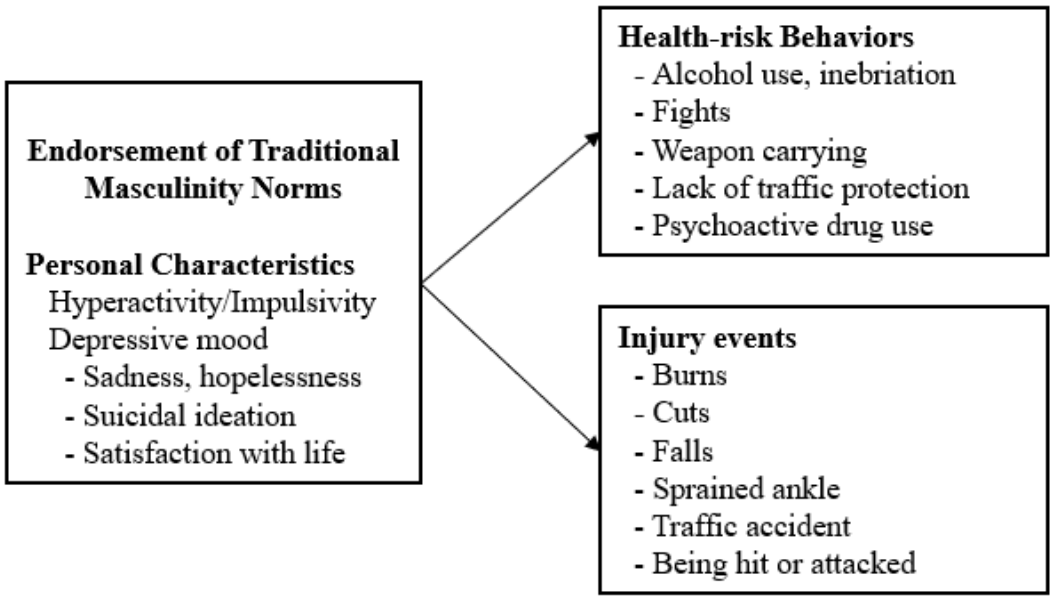

Figure 1. Conceptual framework of the study- Objective 3

The present study used data from the "Croatian Adolescent Masculinity Study", a study supported by the Ministry of Science, Education and Sports of the Republic of Croatia and implemented with the School of Public Health Andrija Štampar from the University of Zagreb. To conduct the main study, an initial step was the translation and cultural adaptation of the research instruments, which preceded chronologically the data collection in schools and is described in the next section.

All the secondary schools (public, private and religious grammar schools and public vocational schools; N=74) in the city of Zagreb were then invited to participate in the study. Twenty-two schools agreed to participate: 5 of 20 public grammar schools, 1 of 4 religious, 3 of 14 private grammar schools, and 13 of 36 vocational schools. Most respondents were 15 to 17 years old at the time of the study (October to mid-November 2015) and were enrolled in the second or third grade of secondary school. (Note: Croatia has 8 years of obligatory primary school starting on average at 6 years of age, followed by 4 years of secondary school. Thus, the second and third grade of secondary school is equivalent to tenth and eleventh grade in other school systems.)

Grammar schools provide a broader education as they prepare students for universities; vocational schools – including technical, industrial and craft schools with a 3- or a 4-year program, give students an occupational degree with no exclusion from access to a university degree.

All second and third-grade students were invited to participate in the study. Of these students, 84.9% (N=4244) completed the survey; 10.2% were absent from school, 3.2% did not participate because of lack of parental permission, and 1.7% of students did not consent. A careful review of responses for inaccuracies and patterned responses led to the removal of 112 surveys. The total of 4132 participants, 2162 males and 1970 females, were surveyed. Based on records from the Office for Education, Culture and Sport of the City of Zagreb, the present sample included 22% of the total population of the second and third-graders. The female respondents were excluded from the sample for the purpose of this study.

4.2. The process of adaptation, translation and cultural adaptation of the instruments

The questionnaire consisted of several existing scales and items. Internationally validated instruments that went through the cultural adaptation and translation were specific items from the Youth Risk Behaviour Survey (YRBS) (79) the Male Role Norm Inventory-Adolescent-revised (MRNI-A-r) (3) and the Injury Checklist (80). The Family Affluence Scale (FAS), used to measure of family wealth, required no translation, as it was already translated to Croatian for the HBSC 2013/2014 study (24, 25). The Hyperactivity and Impulsivity Scales did not require translation because it was previously developed in Croatian language, and was also previously validated with Croatian adolescents (81).

The integrated method of translation and cultural adaptation (82) for translating all of the (originally English) instruments to Croatian was used in this study. The process of translation and cultural adaptation consisted six phases, as detailed bellow.

Phase 1 Selection of instruments for cultural adaptation and translation by researchers, through the literature review

Over 600 scientific articles were critically reviewed for underpinning theoretical framework and psychometric properties, selecting those that were recent and had good psychometric properties.

Phase 2 Assessment of conceptual equivalence by a community advisory committee through rating of item's comprehension and relevance and group discussion of the cultural relevance

A *Community advisory committee* was formed. The committee comprised seven self-identified bicultural and bilingual members, including high school students as key informants, as well as health, community and education professionals. The process was supervised by an independent researcher, well documented and later analyzed in detail using transcripts. The advisory committee and the supervisor did not conduct any of the actual research or the writing of the dissertation. Their role was to advise the researchers on the adaptation of the tools based on their expertise, completely voluntarily. All of the adaptations were finalized by the research team.

After presenting the concepts of interest and reading the list of indicators, the committee members rated the cultural relevance and comprehension of each item individually, in a process grounded in the validity index method (83), and then rated the results in the group discussion. They next discussed the items and detected challenges that respondents might have in understanding and answering the survey.

Based on these steps, modification of items using the decentering method was done (meaning that it was done in source language) involving revision of the original instrument in English (84). If items had been difficult to understand, irrelevant, offensive, that would have led to exclusion of items.

Phase 3: Forward Translation

The modified tool was translated by two separate translators, who initially met with the research team to get the better understanding of the results of the previous phase. After each

translated the tool independently, they again met with the community group and continued the discussion on finding the optimal translation.

Phase 4: Back Translation

For quality control, another translator conducted the back translation; reconciling back with the first team of translators after his part of the process was done, again to work on the discrepancies and getting the tool ready for testing.

Phase 5: Pretesting

This phase was conducted with two separate groups of students with the same characteristics (age, school type) as the target population, one bilingual (who evaluated the quality of translation for clarity and equivalence of meaning) and the other group only Croatian speakers (evaluating clarity and cultural relevance), in writing and through oral discussion. Final modifications to the instrument were made when these steps were completed.

4.3. Measures

Research was implemented using the questionnaire developed through the project of the University in Zagreb, "Prevention of accidents and improving the safety of children", 2013. The “Croatian Adolescent Masculinity Study” was done as a study partially supported under this broader project. The questionnaire was developed by using (a) already existing, validated instruments; (b) some of the items or modified items from the same instruments; and (c) newly developed items. The final questionnaire had 218 items. Not all these items were analysed for this doctoral dissertation, as they were not relevant for the study hypothesis or the goals.

4.3.1. Masculinity

The Male Role Norm Inventory-Adolescent-revised (MRNI-A-r) (3) measures participants’ support for traditional masculinity norms and beliefs about appropriate behavior for adolescent boys. Respondents indicated their level of agreement with each statement on a 7-point Likert scale (1 *Strongly Disagree* to 7 *Strongly agree*). The total scale, as proposed by Levant, consisted of 41 items (alpha=0.93), which includes five subscales: Avoidance of Femininity (8 items, alpha=0.83; e.g., “Guys should not be allowed to wear skirts.”), Self-Reliance (6 items, alpha=0.67; e.g., “A guy should be able to decide things for himself without asking for help.”), Aggression (8 items, alpha=0.75; e.g., “A guy should defend his

sister, even if it is dangerous."), Achievement/Status (8 items, alpha=0.69; e.g., "When in a group of guys and girls, guys should always make the final decision.") and Restrictive Emotionality (11 items, alpha=0.83; e.g., "It's not ok for guys to hug each other."). Scales were calculated as the average of the items, with higher scores indicating stronger support for the construct.

In the previous study by the author showed that masculinity was associated with bullying behaviors for boys and girls (35). Further, girls consistently showed lower scores than boys in all MRNI scales.

4.3.2. Personal characteristics and environment

Age was was measured with one question: "What year were you born?". Responses could range between *1* and *5* (*1997* and *2001)*. The age question was used to describe the students according to their grades.

This study used a composite of two scales: **hyperactivity** (6 items, alpha=0.84; e.g. "It is hard for me to stand still.") and **impulsivity** (4 items, alpha=0.75; e.g. "I interrupt people when they are talking") (81). Respondents indicate how frequent the statement describes them on a 5-point Likert scale (1 *Never* to 5 *Very often*). For this study, the items were combined into a Hyperactivity/Impulsivity scale (10 items, alpha=0.86).

Depressive mood was measured through feelings of sadness or hopelessness, suicidal ideation and satisfaction with life. Feelings of **sadness or hopelessness** were measured with one question from the YRBS: "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" Response categories were *yes* and *no*. .

To assess **suicidal ideation**, answers to two questions from the YRBS were combined, whether students had seriously considered attempting suicide and whether they had made a plan to attempt suicide. Respondents who answered *Yes* to one or both items were defined as having suicidal ideation. The timeframe was the prior year and response categories were *yes* and *no*.

The Cantril Ladder was used to measure **satisfaction with life** (85, 86). Respondents answered the following question: "In the right side of the scale is 10 as the greatest satisfaction with life, and on the left side is 0 as the least satisfaction with life. Where do you think you generally are on this scale?*"* Responses could range between *0* and *10*.

Socioeconomic status was measured with the Family Affluence Scale (FAS) (24, 25). The measure included having computers, laptops or tablets in the family (response categories: *none, one, two* and *two or more*); the number of cars in their family (response categories: *no, one* and *two or more*); having their own bedroom (response categories: *yes* and *no*); the family owning a dishwasher (response categories: *yes* and *no*); the number of bathrooms in the family home (response categories: *none, one, two* and *two or more*); and the frequency of family holidays outside of Croatia (response categories: *not once, once, two times* and *more than two times*). The scale score is computed as the sum of these items with scores ranging between 0 and 13; higher scores represent more wealth.

Additionally, one question on self-assessment of the family affluence from the YRBS was used ("How is your material status in comparison to other families in our country?"). Response categories ranged between 1 (*Much better than the others*) and 7 (*Much worse than the others*).

Grade was used as an indicator of the microenvironment. The division of the sample according to the grade (2nd and 3rd) was done based on the coding of the surveys.

School type was used as another indicator of the microenvironment. For the analysis in this study, we divided schools into 4 categories: grammar schools and vocational schools (school that provide vocation after finishing them, including technical, industrial and craft schools); that were divided into vocational mostly male, vocational mostly female and vocational mixed-gender schools. Vocational schools were categorized as mostly of one sex if at least two-thirds of the participants were from that sex. Grammar schools were included in the analysis as a single category without a specific nomination of gender predominance, given that their overall population was gender balanced, except for three small private grammar schools, in which the number of students was too low to conclude them being gender dominant.

Current residence was used as an indicator for the macroenvironment. Participants indicated the place of their current residence, using one item ("Where do you currently live?"). Response categories were: *In the city centre*, *In the suburb of Zagreb*, *In a small town near Zagreb*, *In a village near Zagreb* and *Somewhere else*. To complement information on the macroenvironment, one question was used on whether respondent lives in the student dorm (professionally run pupils' joined housing; "Do you live in a student dorm?"). Possible responses were *yes* and *no.*

4.3.3. Health-risk behaviors and injury events

Health-risk behaviors were measured using the items from the YRBS (79), including questions about alcohol and drug use, fights, weapon carrying and traffic protection.

Alcohol consumption was measured with two questions, measuring the number of days drinking at least one drink of alcohol and the number of days having 5 or more drinks of alcohol in a row (inebriation). The timeframe was the 30 days prior to the survey. Response categories were *0 days*, *1 or 2 days*, *3 to 5 days*, *6 to 9 days*, *10 to 19 days*, *20 to 29 days* and *All 30 days*.

The use of **psychoactive drugs** was measured using items measuring the number of times using a specific drug (e.g. "During your lifetime how many times did you use marihuana?"). Respondents indicated the frequency of using the following substances: marijuana, cocaine, inhalants, heroin, amphetamine, ecstasy, steroids, non-prescribed over the counter medicines, using the needle to inject a drug and using the synthetic drugs sold as a legal air freshener (new psychoactive substances). Response categories were *0 times*, *1 or 2 times*, *3 to 5 times*, *6 to 9 times*, *10 to 19 times*, *20 to 39 times* and *40 or more times*.

Participating in **fights** was measured with three questions. For the first two ("During the last 12 months, how many times did you participate in a fight?" and "During the last 12 months, how many times did you participate in a fight on the school property?"), response categories were *0 times*, *1 time*, *2 or 3 times*, *4 to 5 times*, *6 or 7 times, 8 or 9 times, 10 or 11 times, 12 or more times*. An additional question captured participation in a fight requiring medical help: "During the last 12 months, how many times did you participate in a fight during which you were hurt so you had to ask for help from a doctor or a nurse/technician?" Response categories were *0 times*, *1 time*, *2 or 3 times*, *4 to 5 times*, *6 or more times*. The timeframe for the questions was the 12 months prior to the survey. Although this latter question could fit under the injuries, it was used as an indicator of more serious fights.

Weapon carrying was measured with two questions. Participants indicated the number of days they carried a weapon such as a gun, knife, or club; and the number of days they carried such weapons on school property. The timeframe for all questions was the 30 days prior to the survey. Response categories were *0 days*, *1 day*, *2 or 3days*, *4 to 5 days*, *6 or more days*.

Two indicators of **traffic protection** were used: wearing a helmet while riding a bike ("When you rode a bike in the last 12 months, how often did you wear a helmet?") and wearing a

seatbelt on the front seat while somebody else is driving. The timeframe for both questions was the year prior to the survey. Respondents indicated their frequency of use on a 5-point scale ranging between *Never* and *Always*. For the question on riding a bike, respondents were additionally offered a response stating non-applicability in case they did not ride a bike in the last year.

To measure **injury events**, respondents indicated whether they were injured by any of the following 12 causes in the year prior to the survey: falls, burns, cuts, almost drowning, being physically attacked, being hit, almost being poisoned by gas, electricity, car traffic, traffic injury that did not include a car, and spraining or extending a joint/ankle or having an injury of bones or muscles. Response categories were *yes* and *no*. The causes of injuries were identified in a meeting with an expert group in the preparation of this study. The expert group consisted of university professors at School of public health "Andrija Štampar", working in the field of public health more broadly as well as injury prevention more specifically.

4.4. Data management and statistical analysis

Data were entered into SPSS, version 25. Two procedures were used to assure the quality of the data. First, 20% of questionnaires were entered twice for quality control of the data entry. Highest error rate per item was 3.7%, which was acceptable given that the desired threshold was <5%. Second, data were carefuly reviewed through visual inspection for inaccuracies and patterned responses, which led to removal of some of a number of surveys (for the exact number, see the Study design and the sample section above).

The results were organized into four sections:

The first section summarizes the results from the adaptation of the MRNI, the internal consistency of the total scale and its subscales, the correlations among subscales, and the means and SD for each subscale and total scale.

The second section presents the univariate statistics (proportions for categorical variables and means and SD for scales) for the personal characteristics, environmental factors, health risk behaviors, and injury events.

The third section presents bivariate statistics examining the association between endorsement of masculinity norms and the other variables in the model. First, correlations between masculinity and personal characteristics, environmental factors, health risk behaviors, and

injury events were presented. Second, mean scores of masculinity were compared for different levels of the variables in the model.

FAS was divided into tertiles: *Low* (32.1%) = 0 to 6, *Medium* (30.3%) = 7 and 8, and *High* (37.5%) = 9 to 13. Hyperactivity/Impulsivity scale was divided into quartiles: *Lowest* (21.2%) = 1 to 2.99, *Low* (23.8%) = 3.00 to 3.49*, High* (29.6%) = 3.50 to 4.09, and *Highest* (25.4%) = 4.10 to 5. Satisfaction with life was divided into quartiles: *Lowest* (19.0%) = 0 to 6.99, *Low* (14.7%) = 7.00 to 7.99*, High* (23.9%) = 8.00 to 8.99, and *Highest* (42.4%) = 9.00 to 10.00. Alcohol, drugs, fights, weapon carrying, traffic behaviors and injury events were dichotomized into never and one or more times, within the time frame of the question. To examine whether mean scores of the MRNI-A-r were significantly different for variables with two groups, independent sample t-test was used. To test the population variance, Levene's test for homogeneity of variances was used before the comparison of means. When the difference in mean scores was significant, Cohen *d* factor was used to measure the effect size, with commonly used interpretation referring to effect sizes as small (d = 0.20), medium (d = 0.50), and large (d = 0.80). To establish differences in mean scores of masculinity among groups for variables with three or four groups, analysis of variance was used. When the analysis of variance was significant, pairwise comparisons were done using the Fisher's Least Significant Difference (LSD) test. When the difference in mean scores was significant, η^2 was calculated to measure the effect size, with commonly used interpretation referring to effect sizes as small ($\eta^2 = 0.01$), medium ($\eta^2 = 0.06$), and large ($\eta^2 > 0.14$).

Finally, the fourth section presents the logistical regression models examining the predictive potential of masculinity for the health risk behaviors and injury events, controlled by personal characteristics. For establishing a significant prediction of health-risk behaviors and injury events, regression analysis was used. Logistic regression was used to evaluate the effects of predictor variable - masculinity, on the odds of engaging in health-risk behavior or participating in an injury event, controlling for the personal characteristics of the participants. The personal characteristics variables that were significantly associated with traditional masculinity norms in previous steps were entered in a logistic regression model with each of the health-risk behavior and injury event outcomes. The total MRNI was included, but not individual subscales, given that the total scale was representative for the construct. The association was controlled using personal characteristics: feeling of sadness in the last 30

days, suicide planning in the same period, combined hyperactivity and impulsivity scale and satisfaction with life scale.

4.5. Ethical principles

The present study used the data from Croatian Adolescent Masculinity Study, as part of a multi-year project supported by the Ministry of Science, Education and Sports of the Republic of Croatia and a multi-year project supported by the University of Zagreb. The ethical committee of the University of Zagreb School of Medicine approved all research procedures. Additionally, permission of the relevant ministry (Republic of Croatia Ministry of Education and Sports) was assured. The Ethical committee approved the study as part of the doctoral thesis application process.

For the implementation of the school-based survey, expert school staff (in most cases pedagogues and psychologists, in rare cases directors or teachers) distributed a letter informing parents about the survey; those who did not want their children to participate returned the letter to the school in due time. Additionally, students assented before participating in the study. Schools provided alternative program in school libraries for students who did not participate, without any sanctions for the lack of participation. Completing the survey took, on average, less than 45 minutes. Students who were absent from school the day the survey was administered did not participate in the study. Trained data collectors conducted the survey during classes using paper and pencil. No incentives were given to schools or to respondents. Data collectors were trained with special sensitivity given the topic of research being gender. Research protocol, interviewer manual and data collection sheets were developed for monitoring of the data collection process. Supervision of data collection was assured by school expert staff and researchers.

5. RESULTS

5.1. Analysis of the MRNI scale

The process of translation and adaptation of the scales was conducted successfully, with most modifications in the MRNI-A-r (3) as described in the next paragraph. No concerns were identified over the group work process itself. The supervisor was checking in with the researchers frequently.

During the translation and adaptation process, only minor modifications were made in the original instrument to improve cultural relevance, mostly making minor changes to reflect the Croatian society. For example, the type of sports was changed to address relevance for Croatian society (and common for the present sample). *Haunted house* (which represents a place of fear in the US culture) was replaced with the expression *dangerous place.* It was challenging to translate the term *guy* to Croatian language, as it misses the term with the exact semantic and conceptual equivalence. Decision was made to use terms *boys* and *young men* in Croatian language, depending on the question. No items were omitted. During pretesting, the wording of only one item was changed.

The psychometric analysis of the masculinity scale was done with the overall sample (N = 2162). Cronbach's alpha coefficients for the scale indicated excellent internal consistency for the developed MRNI-A-r composite scale (3). The Croatian version of MRNI-A-r presented good to acceptable internal consistencies for the subscales: Avoidance of Femininity (8 items, $\alpha = 0.80$), Self-Reliance (6 items, $\alpha = 0.66$), Aggression (8 items, $\alpha = 0.73$), Achievement/Status (8 items, $\alpha = 0.67$), and Restrictive Emotionality (11 items, $\alpha = 0.80$); as well as for the total scale (41 items, $\alpha = 0.92$).

The correlations between subscales and total MRNI scale were .80 or above, and the correlations among subscales ranged between 0.52 and 0.65 (Table 1).

Table 1 Correlations between subscales of masculinity and the total MRNI scale

	(1) r	(2) r	(3) r	(4) r	(5) r	(6) r
(1) Avoidance of masculinity	1					
(2) Self-reliance	0.53*	1				
(3) Aggression	0.60*	0.62*	1			
(4) Achievement/Status	0.52*	0.60*	0.62*	1		
(5) Restrictive Emotionality	0.60*	0.65*	0.63*	0.60*	1	
(6) MRNI –A-r Total	0.81*	0.80*	0.84*	0.80*	0.87*	1

*Correlation is significant at the 0.05 level.

The means of the subscales and total scale ranged between 3.34 and 4.67, which are generally close to the middle point of each scale (Table 2).

Table 2 Means and SD for masculinity

Continuous variables	**Mean**	**SD**	**Range**	**N**
Masculinity				
Avoidance of Femininity	4.67	1.35	1 – 7	2147
Self-reliance	3.94	1.15	1 – 7	2136
Aggression	4.42	1.10	1 – 7	2149
Achievement/Status	3.43	1.03	1 – 7	2154
Restrictive Emotionality	3.69	1.05	1 – 7	2149
MRNI –A-r Total	3.62	0.93	1 – 7	2151

5.2. Univariate statistics for the personal characteristics, environmental factors, health risk behaviors and injury events

5.2.1. Personal and environmental characteristics of the sample

Tables 3a and 3b present the personal and environmental characteristics of the sample.

Examining the age, the majority of second graders were born in 1999 (73%), and the majority of third graders were born in 1998 (72%).

Regarding emotional characteristics, one in 5 boys reported feeling sad or hopeless and more than one in ten reported considering

Students completed the FAS (ranges from 0 to 13, with higher scores indicating more Family wealth) and one item assessing their perceived family affluence (ranges from 1 to 7, with higher scores indicating better family affluence compared to others). The mean score for the FAS was 7.71 (SD=2.44), and for self-assessment was 3.59 (SD=1.08). Given the high Pearson correlation between the two scales ($r=0.42$; $P < 0.001$), the results confirmed that FAS could be used for the measurement of the family affluence.

The sample was evenly distributed between the second and third grades.

Respondents attended grammar (17.7% of the sample) and vocational schools (82.3%). The vocational schools were divided into the three categories: vocational male schools (51.6%), vocational mixed schools (18.5%) and vocational female schools (12.2%).

Most of the students lived in the urban setting, with only a small proportion of respondents declared their habitat as rural (11.4%). Majority of students reported living in the city centre and in the suburbs of Zagreb,while the smaller percentage reported living in a smaller city.

Table 3a Proportion of responses for personal and environmental characteristics (categorical variables)

Categorical variables	%	N
Grade		
Second	52.6	1083
Third	47.4	976
Year born		
1997	6.6	141
1998	39.6	852
1999	45.4	978
2000	8.3	178
2001	0.1	3
Type of school		
Grammar	17.7	382
Male vocational	51.6	1115
Female vocational	12.2	264
Mixed vocational	18.5	405
Urban/rural location		
City centre	31.9	682
Suburb of Zagreb	41.9	894
Smaller city	8.9	189
Village (rural)	11.4	244
Emotional characteristics		
Felt sad or hopeless	19.6	2108
Had suicidal ideation	11.7	2105

Table 3b Description of the sample: Means and SD for personal and environmental characteristics

Continuous variables	Mean	SD	Range	N
Other scales				
Family Affluence Scale	7.71	2.44	1 – 13	2088
Self-Assessment of affluence	3.59	1.08	1 – 7	2118
Hyperactivity/Impulsivity	2.60	0.80	1 – 5	2150
Satisfaction with life	7.83	2.10	0 – 10	1781

5.2.2. Health risk behaviors and injury events frequencies

Alcohol consumption was the rule more than an exception, with the large majority reporting having at least 1 drink in the 30 days prior to the survey, and half of them got drunk in the same time period. Table 4 presents the frequencies of health-risk behaviors and injury events. The behaviors or events that had a frequency below 10% were excluded from the later analysis.

The prevalence of lifetime use of psychoactive substance showed worrisome results. The most frequently used drugs were marihuana, synthetic drugs such as air freshener ("new psychoactive drugs"), and prescription drugs without a doctor's order .

More than third of boys reported fighting in the year prior to the survey, many of them in the school property.

Almost one is six students reported carrying a weapon like a knife, stick, gun or club in the past 12 months, with one in ten students reporting carrying on school property.

The large majority of students who rode a bicycle never wore a helmet (91.3%). One in five students never wore a seatbelt when sitting on the front seat of a car.

Table 4 Frequencies of health-risk behaviors

Health-risk behaviors	N	%
Alcohol[1]		
Had at least one drink	2092	73.1
Was inebriated	2082	49.9
Experimenting with psychoactive drugs[2]		
Smoked marihuana	2088	39.5
Used synthetic drug/air freshener	2072	15.8
Used prescription drugs without doctor's prescription	2071	15.8
Used inhalants	2074	12.0
Used amphetamine	2077	7.4
Used cocaine	2084	6.8
Used ecstasy	2079	6.4
Used steroids	2075	5.9
Used heroin	2078	4.4
Injected drugs	2072	4.2
Participating in fights[3]		
Participated in a fight	2110	35.8
Participated in a fight on the school property	2109	12.3
Participated in fight requiring medical help	2113	7.6
Weapon carrying[1]		
Carried a weapon	2115	17.3
Carried a weapon in school	2117	9.5
Transport-related behavior		
Never wore a helmet when biking[4]	1830	91.3
Never or rarely wore a seatbelt in a car	2139	19.3

[1] Timeframe is 30 days

[2] Timeframe is lifetime

[3] Timeframe is 12 months

[4] Proportion calculated over those who did bike

The most common events that lead to injuries during the year prior to the survey were cuts, falls, burns and sprained ankles. Half of respondents reported being hit or physically attacked.

Other types of injury events were less frequent. Table 5 presents the prevalence of the most prevalent injury events.

Table 5 Frequencies of most common injury events in the past 12 months

Injury events	**%**	**N**
Cuts	72.2	2133
Falls	67.7	2146
Burns	55.8	2147
Being hit or physically attacked	49.4	2137
Spraining or extending a joint/ankle or having an injury of bones or muscles	48.2	2153
Traffic accident (car or no car)	10.6	2137

Less frequent events were excluded from presentation, including almost drowning, incidents with electricity, gas poisoning, nearly drowning.

5.3. Bivariate statistics examining the association between endorsement of masculinity norms and the other variables

5.3.1. Correlations between masculinity and personal and environmental characteristics, health risk behaviors, and injury events

Endorsement of traditional masculinity showed a statistically significant correlation, albeit low, with most of the personal and environmental characteristics (except for the age and grade) (Table 6a). Similarly, masculinity was significantly correlated to fights, weapon carrying, alcohol use and risky traffic behaviors (Table 6b).

Table 6a. Correlations between endorsement of masculinity norms and personal and environmental characteristics

	(1) r	(2) r	(3) r	(4) r	(5) r	(6) r
(1) MRNI-A-r	1					
(2) Year born	-0.18	1				
(3) Hyperactivity/Impulsivity	0.25*	-0.03	1			
(4) Life Satisfaction	0.09*	0.07*	0.02	1		
(5) Family Affluence (FAS)	0.06*	0.00	0.03	0.16*	1	
(6) Self-assessment of wealth	0.08*	0.00	0.05*	0.22*	0.37*	1
(7) Grade	0.01	-0.73*	0.01	-0.07*	0.00	0.01

*Correlation is significant at the 0.05 level.

Table 6b. Correlations between endorsement of masculinity norms and health-risk behaviors and sum of injury events

Health-risk behaviors	(1) r	(2) r	(3) r	(4) r	(5) r	(6) r	(7) r
(1) MRNI-A-r	1						
(2) Alcohol use – month	0.10*	1					
(3) Drug use - ever	0.04	0.35*	1				
(4) Fights – year	0.15*	0.28*	0.27*	1			
(5) Weapon carrying - month	0.10*	0.20*	0.23*	0.31*	1		
(6) Seatbelt use - always	-0.12*	-0.11*	-0.12*	-0.14*	-0.09*	1	
(7) Helmet use - always	-0.06*	-0.10*	-0.06*	-0.07*	0.02	0.07*	1
(8) Sum of injury events – year	-0.01	0.05*	0.03	0.05*	0.03	-0.05*	-0.01

*Correlation is significant at the 0.05 level.

5.3.2. Comparison of mean scores of masculinity for different levels of the variables in the model

Greater endorsement of traditional masculinity norms was not significantly associated with age nor with feeling sad or hopeless. Contrary to expectations, boys who reported suicidal ideation scored in average significantly lower on the masculinity scale. For the Hyperactivity/Impulsivity scale, masculinity scores increased consistently from the low scores of hyperactivity/Impulsivity to the high scores (η^2=0.085). Boys who expressed the greater

satisfaction with life also scored higher on the masculinity scores (η^2=0.013). The Table 7a presents the comparison of mean scores of endorsement of masculinity norms and personal characteristics.

Students with low family affluence scored lower in traditional masculinity norms than those in with medium or high family affluence (η^2=0.009).

Examining the type of the school, significant associations were found between the type of school (as an indicator of microenvironment) and the endorsement of traditional masculinity norms: the boys from vocational male schools endorsed traditional masculinity norms significantly more than those boys going to (mixed) grammar schools.

No significant association were found between endorsement of traditional masculinity norms and grade level or with urban/rural location.

The Table 7b presents the comparison of mean scores of endorsement of masculinity norms and environmental characteristics.

Table 7a. Comparison of mean scores of endorsement of masculinity norms and personal characteristics

	Masculinity norms Mean (SD)	F / t test	P value	Comparison*
Year born				
(1) 1997	4.02 (0.89)	0.74	0.568	ns
(2) 1998	4.03 (0.92)			
(3) 1999	3.98 (0.94)			
(4) 2000	4.09 (0.97)			
(5) 2001	3.81 (0.56)			
Hyperactivity/Impulsivity				
(1) Lowest quartile	3.71 (0.90)	37.88	<0.001	1<2,3<4
(2) Low	3.92 (0.87)			
(3) High	4.02 (0.89)			
(4) Highest	4.31 (0.96)			
Sad or hopeless (12 months)				
(1) No	4.03 (0.92)	1.78	0.076	ns
(2) Yes	3.94 (0.97)			
Suicidal ideation (12 months)				
(1) No	4.03 (0.92)	2.15	0.032	1>2
(2) Yes	3.89 (0.99)			
Satisfaction with life				
(1) Lowest quartile	3.87 (0.92)	7.06	<0.001	1,2,3<4
(2) Low	3.98 (0.92)			
(3) High	3.91 (0.85)			
(4) Highest	4.11 (0.95)			

Note. Masculinity scale ranges from 1 to 7, with higher scores indicating more support of the construct.

*For variables with more than two groups, comparison was done using the Fisher's Least Significant Difference (LSD) test.

Table 7b. Comparison of mean scores of endorsement of masculinity norms and environmental characteristics

	Masculinity norms Mean (SD)	F / t test	P value	Comparison*
Family affluence				
(1) Low tertile	3.93 (0.89)	3.84	0.022	1<2,3
(2) Medium tertile	4.03 (0.91)			
(3) High tertile	4.06 (0.93)			
Grade				
(1) Second	4.00 (0.95)	0.83	0.774	ns
(2) Third	4.01 (0.92)			
School type				
(1) Grammar	3.90 (0.97)	3.22	0.022	1<2
(2) Vocational, mostly male	4.06 (0.89)			
(3) Vocational, mostly female	3.99 (0.99)			
(4) Vocational, mixed gender	3.97 (0.97)			
Urban/rural location				
(1) City centre	4.03 (0.94)	0.89	0.447	ns
(2) Suburb of Zagreb	4.00 (0.93)			
(3) Small town, near Zagreb	3.93 (0.96)			
(4) Village, near Zagreb	4.07 (0.90)			

Note. Masculinity scale ranges from 1 to 7, with higher scores indicating more support of the construct.

* For variables with more than two groups, comparison was done using the Fisher's Least Significant Difference (LSD) test.

Means scores of endorsement of traditional masculinity were compared for each pair (Tables 8a and 8b). Endorsement of traditional masculinity norms was significantly higher for students who reported drinking alcohol in the past 30 days and for those who got drunk in the same time period. Masculinity scores were higher for students who reported the use of the majority of most common psychoactive substances use, including inhalants, non-prescribed drugs and air fresheners and greater endorsement of traditional masculinity norms. For

marihuana, the association with masculinity was not significant. Greater endorsement of traditional masculinity attitudes was significantly associated with fighting in the last year and with carrying a weapon in the last 30 days. Greater endorsement of traditional masculinity was also found among students reporting inconsistent use of seatbelts while driving in the car sitting on the front seat.

The greater endorsement of traditional masculinity norms was significantly associated with one of the most common events that lead to injuries: spraining or extending a joint/ankle or having an injury of bones or muscles, as well as with near-drowning incident (with a very low effect size), while no associations were identified for other injury events. Effect size for the health risk behaviors and injury events varying significantly by masculinity norms are presented in Table 8c.

Table 8a. Comparison of mean scores of endorsement of masculinity norms and health risk behaviors

Health Risk Behavior	Total prevalence %	Masculinity norms No risk/no use Mean (SD)	Masculinity norms Health risk/use Mean (SD)	t test	P value
Alcohol					
Drank alcohol (30 days)	73.1	3.87 (0.94)	4.06 (0.92)	-4.11	<0.001
Got drunk (30 days)	49.9	3.92 (0.90)	4.10 (0.95)	-4.43	<0.001
Drugs					
Used any drug (lifetime)	50.2	3.97 (0.92)	4.04 (0.95)	-1.71	0.087
Marihuana	39.5	3.98 (0.92)	4.05 (0.96)	-1.62	0.106
Synthetic drug/air freshener	15.8	3.98 (0.92)	4.14 (0.96)	-2.71	0.007
Prescription drug	15.8	3.99 (0.92)	4.11 (0.98)	-2.07	0.038
Inhalant	12.0	3.99 (0.93)	4.13 (0.94)	-2.22	0.026
Amphetamine	7.4	4.00 (0.93)	4.09 (0.98)	-1.21	0.228
Cocaine	6.8	3.99 (0.93)	4.23 (0.95)	-2.88	0.004
Ecstasy	6.4	4.00 (0.93)	4.12 (0.98)	-1.43	0.154
Steroids	5.9	4.00 (0.93)	4.12 (1.02)	-1.41	0.158
Heroin	4.4	4.00 (0.93)	4.19 (1.01)	-1.95	0.051
Injected drugs	4.2	4.00 (0.93)	4.19 (1.02)	-1.87	0.062
Fighting					
Fought (12 months)	35.8	3.90 (0.90)	4.20 (0.95)	-7.062	<0.001
Fought at school (12 m)	12.3	3.97 (0.92)	4.27 (0.98)	-4.87	<0.001
Fought requiring medical help (12 m)	7.6	3.99 (0.92)	4.25 (0.99)	-3.41	0.001
Weapons					
Carried a weapon	16.9	3.97 (0.91)	4.20 (0.99)	-4.397	<0.001
Carried a weapon to school (12 months)	9.5	3.97 (0.91)	4.32 (1.08)	-5.02	<0.001
Traffic behaviors					
Always wore a seatbelt	48.2	3.88 (0.96)	4.11 (0.93)	5.56	<0.001
Wore a helmet when riding bike	8.7	3.81 (0.92)	4.04 (0.92)	3.00	0.003

Note. Masculinity scale ranges from 1 to 7, with higher scores indicating more support of the construct.

Timeframe for drinking, getting inebriated, fighting and carrying a weapon is the 12 months before the survey. Timeframe for using substances other than alcohol is ever in life.

Table 8b. Comparison of mean scores of endorsement of masculinity norms and injury events

Type of Injury	Total prevalence %	Masculinity norms No risk Mean (SD)	Masculinity norms Health risk Mean (SD)	t test	P value
Any injury event (12 months)	97.5	4.05 (0.99)	4.01 (0.93)	0.33	0.739
Got cut	72.2	4.00 (0.90)	4.02 (0.94)	-0.42	0.676
Fell	67.7	4.04 (0.91)	3.99 (0.94)	1.14	0.252
Got burned	55.8	4.06 (0.94)	3.97 (0.92)	2.24	0.025
Injured joint/ankle, bones or muscles	48.2	3.90 (0.92)	4.12 (0.93)	-5.49	<0.001
Got hit or physically attacked	49.4	4.00 (0.94)	4.02 (0.92)	-0.64	0.525
Had a traffic accident (car or no car)	10.6	4.00 (0.92)	4.05 (0.98)	-0.75	0.455
Had incident with electricity	10.0	4.01 (0.93)	4.05 (0.93)	-0.65	0.519
Almost drowned	5.8	4.00 (0.93)	4.23 (0.99)	-2.71	0.007
Almost got poisoned by gas	2.3	4.00 (0.93)	4.20 (0.96)	-1.47	0.142

Note. Masculinity scale ranges from 1 to 7, with higher scores indicating more support of the construct.

Table 8c. Effect size for the health risk behaviors and injury events varying significantly by masculinity norms

	Cohen's *d*
Alcohol and Drugs	
Drank alcohol (30 days)	0.2043
Got drunk (30 days)	0.1945
Synthetic drug/air freshener	0.1702
Prescription drug	0.1263
Inhalant	0.1497
Cocaine	0.2553
Fighting and Weapons	
Fought (12 months)	0.3242
Fought at school (12 months)	0.3156
Fought requiring medical help (12 months)	0.2721
Carried a weapon (12 months)	0.2419
Carried a weapon to school (12 months)	0.3505
Traffic Safety	
Always wore a seatbelt	0.2434
Wore a helmet when riding bike	0.2500
Injuries	
Injured joint/ankle, bones or muscles (12 months)	0.2378
Almost drowned (12 months)	0.2395

NOTE: Only variables with effect sizes > 0.1 are presented

Timeframe for using substances other than alcohol is ever in life.

5.4. Masculinity, health-risk behaviors and injury events – predicting the outcome

This research explores if masculinity is a possible cause of health-risk behaviors and injury events. A model was used in which causal relation of the endorsement of traditional masculinity was explored using regression. Personal characteristics were included as confounders in the model used, specifically hyperactivity/impulsivity and depressive mood,

operationalized through being sad, suicidal ideation and satisfaction with life. The environmental confounders, were not included, as this research focuses on possible entry point for working directly with boys, as part of life skills training and mental health hazard prevention, not on environmental interventions. Confounding effects of some health risk behaviors and injury events on the causation of others were also outside of the scope of this research.

5.4.1. Health-risk behaviors

After the adjustment for hyperactivity/impulsivity, suicide ideation, feeling sad or hopeless, and satisfaction with life, higher scores of MRNI-A-r were a risk factor for drinking alcohol and getting drunk, fighting on and off the school property, carrying a weapon in and out of school, *never* or *rarely* wearing a seatbelt when riding in a car, and using inhalants. MRNI-A-r was not associated with smoking marihuana, using non-prescribed drugs or inhaling air freshener (new psychoactive substance) (Tables 9, 10 and 11).

Table 9. Odds of using alcohol in the past 30 days by masculinity

	OR	95% CI for OR	*P*
Drank Alcohol			
MRNI-A-R	1.18	(1.04, 1.33)	0.009
Hyperactivity/impulsivity	1.57	(1.35, 1.82)	< 0.001
Suicide ideation[1]	0.52	(0.34, 0.78)	0.002
Feeling sad or hopeless[1]	1.36	(1.01, 1.83)	0.040
Satisfaction with life	1.07	(1.02, 1.13)	0.009
Got drunk			
MRNI	1.13	(1.02, 1.27)	0.026
Hyperactivity/impulsivity	1.66	(1.46, 1.90)	<0.001
Suicide ideation[1]	0.56	(0.40, 0.79)	0.001
Feeling sad or hopeless[1]	0.95	(0.73, 1.25)	0.724
Satisfaction with life	1.05	(1.00, 1.11)	0.043

[1]Timeframe is past 12 months

Table 10 Odds of engaging in different health-risk behaviors by masculinity

	OR	95% CI for OR	*P*
Fought[1]			
MRNI	1.35	(1.20, 1.52)	<0.001
Hyperactivity/impulsivity	1.59	(1.39, 1.82)	<0.001
Suicide ideation[1]	0.45	(0.32, 0.64)	<0.001
Feeling sad or hopeless[1]	0.85	(0.65, 1.13)	0.266
Satisfaction with life	1.06	(1.00, 1.11)	0.044
Fought at school property[1]			
MRNI	1.34	(1.13, 1.59)	0.001
Hyperactivity/impulsivity	1.46	(1.21, 1.76)	<0.001
Suicide ideation[1]	0.33	(0.22, 0.50)	<0.001
Feeling sad or hopeless[1]	0.70	(0.48, 1.02)	0.061
Satisfaction with life	1.03	(0.95, 1.10)	0.503
Carried a weapon[2]			
MRNI	1.31	(1.13, 1.52)	<0.001
Hyperactivity/impulsivity	1.40	(1.19, 1.65)	<0.001
Suicide ideation[1]	0.55	(0.37, 0.82)	0.003
Feeling sad or hopeless[1]	0.70	(0.50, 0.98)	0.036
Satisfaction with life	1.04	(0.97, 1.11)	0.294
Carried a weapon to school[2]			
MRNI	1.39	(1.14, 1.69)	0.001
Hyperactivity/impulsivity	1.74	(1.41, 2.15)	<0.001
Suicide ideation[1]	0.34	(0.21, 0.54)	<0.001
Feeling sad or hopeless[1]	0.88	(0.57, 1.36)	0.562
Satisfaction with life	1.10	(1.00, 1.20)	0.042
Never or rarely wearing a seatbelt			
MRNI	0.78	(0.70, 0.87)	<0.001
Hyperactivity/impulsivity	0.76	(0.67, 0.86)	<0.001
Suicide ideation[1]	1.40	(0.99, 1.98)	0.054
Feeling sad or hopeless[1]	0.96	(0.73, 1.26)	0.770
Satisfaction with life	1.02	(0.97, 1.07)	0.560

Note. Results for wearing a seatbelt present positive behavior (always wearing a seatbelt)

[1]Timeframe is past 12 months; [2]Timeframe is past 30 days

Table 11 Odds of ever using substances by masculinity

	OR	95% CI for OR	*P*
Marihuana			
MRNI	1.04	(0.93, 1.17)	0.502
Hyperactivity/impulsivity	1.64	(1.44, 1.88)	<0.001
Suicide ideation[1]	0.46	(0.32, 0.64)	<0.001
Feeling sad or hopeless[1]	0.93	(0.71, 1.22)	0.576
Satisfaction with life	0.98	(0.93, 1.03)	0.333
Non-prescribed drugs			
MRNI	1.13	(0.97, 1.31)	0.117
Hyperactivity/impulsivity	1.38	(1.16, 1.63)	<0.001
Suicide ideation[1]	0.51	(0.35, 0.76)	0.001
Feeling sad or hopeless[1]	0.62	(0.45, 0.87)	0.005
Satisfaction with life	1.03	(0.96, 1.10)	0.383
Inhalants			
MRNI	1.22	(1.03, 1.45)	0.025
Hyperactivity/impulsivity	1.42	(1.18, 1.72)	<0.001
Suicide ideation[1]	0.33	(0.22, 0.50)	<0.001
Feeling sad or hopeless[1]	0.66	(0.46, 0.96)	0.028
Satisfaction with life	0.99	(0.92, 1.06)	0.775
Air freshener			
MRNI	1.16	(0.99, 1.35)	0.066
Hyperactivity/impulsivity	1.49	(1.26, 1.77)	<0.001
Suicide ideation[1]	0.33	(0.22, 0.48)	<0.001
Feeling sad or hopeless[1]	0.84	(0.60, 1.19)	0.333
Satisfaction with life	1.01	(0.94, 1.08)	0.857

[1]Timeframe is past 12 months

5.4.2. Injury events

After the adjustment for hyperactivity/impulsivity, suicide ideation, feeling sad or hopeless, and satisfaction with life, higher scores of MRNI-A-r were associated with extending a joint/ankle or having an injury of bones or muscles. Interestingly, greater endorsement of traditional masculinity norms predicted lower likelihood of suffering from burns. MRNI-A-r was not associated with any of the other injury events (Tables 12 a and b).

Table 12a. Odds of injury events in past 12 months by masculinity

	OR	95% CI for OR	*P*
Falls			
MRNI	0.86	(0.76, 0.96)	0.008
Hyperactivity/impulsivity	1.58	(1.38, 1.82)	<0.001
Suicide ideation[1]	0.93	(0.69, 1.41)	0.933
Feeling sad or hopeless[1]	1.09	(0.82, 1.44)	0.559
Satisfaction with life	1.00	(0.95, 1.06)	0.903
Cuts			
MRNI	0.98	(0.87, 1.11)	0.734
Hyperactivity/impulsivity	1.38	(1.19, 1.59)	<0.001
Suicide ideation[1]	0.96	(0.65, 1.41)	0.827
Feeling sad or hopeless[1]	0.79	(0.58, 1.07)	0.122
Satisfaction with life	0.97	(0.92, 1.03)	0.338
Being hit or attacked			
MRNI	0.98	(0.88, 1.10)	0.765
Hyperactivity/impulsivity	1.54	(1.36, 1.76)	<0.001
Suicide ideation[1]	0.64	(0.45, 0.90)	0.009
Feeling sad or hopeless[1]	0.76	(0.58, 0.99)	0.044
Satisfaction with life	1.01	(0.96, 1.06)	0.737

[1]Timeframe is past 12 months

Table 12b. Odds of injury events in past 12 months by masculinity

	OR	95% CI for OR	*P*
Car accident			
MRNI	0.99	(0.83, 1.18)	0.883
Hyperactivity/impulsivity	1.51	(1.24, 1.85)	<0.001
Suicide ideation[1]	0.58	(0.36, 0.94)	0.026
Feeling sad or hopeless[1]	0.79	(0.52, 1.18)	0.245
Satisfaction with life	1.07	(0.99, 1.17)	0.093
Burns			
MRNI	0.85	(0.76, 0.95)	0.003
Hyperactivity/impulsivity	1.45	(1.28, 1.66)	<0.001
Suicide ideation[1]	0.83	(0.60, 1.17)	0.290
Feeling sad or hopeless[1]	0.81	(0.62, 1.06)	0.117
Satisfaction with life	1.02	(0.97, 1.07)	0.445
Joint/ankle, bones or muscles injury			
MRNI	1.22	(1.09, 1.36)	<0.001
Hyperactivity/impulsivity	1.34	(1.18, 1.52)	<0.001
Suicide ideation[1]	0.96	(0.69, 1.340	0.809
Feeling sad or hopeless[1]	0.72	(0.56, 0.94)	0.016
Satisfaction with life	1.04	(0.99, 1.09)	0.113

[1]Timeframe is past 12 months

6. DISCUSSION

The present cross-sectional study conducted with a sample of over 2000 students from diverse schools and socio-economic backgrounds in the City of Zagreb examined the association between expressed attitudes toward traditional masculinity norms and (1) personal and environmental factors, (2) behaviors that present risk for safety, and (3) injuries among high school students.

The hypothesis of the study was confirmed, that *expressed attitudes endorsing traditional masculinity norms measured through five dimensions (avoidance of femininity, self-reliance, aggressive dominance, achievement/status and restrictive emotionality) are a significant predictor of behaviors that present risk for safety among high school students from the City of Zagreb aged 16 and 17.*

The major finding of the study was that stronger endorsement of traditional masculinity norms was associated with reports of various health-risk behaviors. However, most of the injury events, except for spraining or extending a joint/ankle or having an injury of bones or muscles, were not associated with the greater endorsement of traditional masculinity norms.

The results of this study could contribute to the development of programs designed to reduce health-risk behaviors, which could in turn lead to a reduction of injuries. By confirming the hypothesis, the study advanced the understanding of the association between social norms of traditional masculinity and the health of young men. The discussion is organized into eight major topics of the study and ends stating the limitations.

Male Role Norms Inventory-Adolescent-revised scale (MRNI-A-r)

A valuable contribution to the science of prevention was the translation and cultural adaptation of a scale designed to measure endorsement of traditional masculinity norms among adolescents. Prior to this study, a tool of this kind was not available for the Croatian context.

The careful process of selection of the best measure and the detailed, theory-driven process of adaption resulted in a scale measuring the endorsement of traditional masculinity norms, previously used in English speaking countries; this tool is now available for use in Croatia.

The translation, cultural adaptation, pretesting and evaluation of the psyhometric properties of the MRNI-A-r was conducted through a step-by-step process. The careful adaptation process

preserved the conceptual equivalence across cultures. Failing to achieve conceptual equivalence can result in measurement error, because of inappropriate content or items' lack of sensitivity (87). The integrated method (82) proved to be a valuable strategy**.** If merely translation of the tools was done, the process could have resulted in changes in the meaning of certain masculinity constructs, given the translation of the tool into a new culture. For instance, what is considered brave or manly in one culture, might not be so in another. Haunted house might be a known construct in USA, where teenagers test their bravery by going inside them, but in Croatian culture, this term is less know and recognized, and this kind of rite-of passage is not present. Thus, cultural adaptation in this case resulted in changing the content of the wording, into a more appropriate construct, in this concrete case, going into a haunted house was substituted by going into dangerous places. Another example is the item on masculinity where softball is used as an example of a sport played by girls – this is a sport not present in the Croatian culture, so it was substituted with a more known sport, also generally identified as being feminine (as desctribed by the members of the adaptation team), in this case, fugure skating. These examples present the importance of cultural adaptation versus only making an exact translation in preserving the underlying dimension measured by a certain item.

By going through a step by step process of adaptation and the translation, the possibility of cross-cultural loss or change of the meaning is reduced. This study has supported the notion that translation of research tools should be a multi-step cross-cultural adaptation and translation process that includes native speakers and representatives of both the source and the target language and culture, as well as a team of translators that work jointly till the optimal meaning is preserved.

Using the Croatian version of the MRNI-A-r, this study is the first of its kind to provide a first glimpse of endorsement of traditional masculinity among youth in Croatia. The overall means for this study was 3.62 (SD=0.93). This score is slightly lower than the one observed in the US in a sample of 162 males, mean age of 12.8 years (*SD*=0.92), where the observed mean for the MRNI-A-r was 3.99 (SD=0.91) (88). The results from this study provide a valuable comparison or baseline for further studies that examine changes over time of endorsement of masculinity norms in Croatia.

However, the results do imply the need for some caution in their analysis. The reason for the difference in the endorsement of traditional masculinity norms between the Croatian and US

teens might be because the sample in Croatia was not representative, while the sample in the US study was. Another possible reason might be in the difference in the age, where the Croatian sample was somewhat older, which might imply that the endorsement of traditional masculinity norms tends to soften with age, which is generally in line with the existing evidence (89). Next, a reason for this might be in the fact that Croatian adolescents indeed endorse traditional masculinity to a lesser extent than their peers in the United Stated. Finally, while the cross-cultural adaptation and translation in the present study was done in line with the existing recommendations, a discrete change in the measurement of masculinity dimension might have occurred, and the Croatian version of the tool might measure the masculinity constructs with less of sensitivity, which should be checked further in future validations of the scale.

Age and grade

Endorsement of traditional masculinity norms did not change by respondent's age and grade. Examining grade and masculinity, this study took into the consideration that adolescence is a sensitive period for the socialization of masculinity, and that the literature suggested that some changes could be seen as boys move from the second to third grade when exploring the developmental trends in masculinity during adolescence; men's endorsement of traditional masculinity becomes significantly less traditional between the middle adolescence and the early adulthood (89). While some scholars have shown changes in specific dimensions of masculinity in a period of one year (90), perhaps, the changes would be greater if the sample included respondents with a larger variation in age range.

Results might also indicate that the whole period of going into the high school is one in which endorsement of traditional masculinity norms is stable, and does not vary. Further research should investigate if there are significant differences in the endorsement of traditional masculinity between explicit benchmarks in the education, such as the crossover from elementary to high school, or from high school into university or labor market, specifically for the Croatian context.

Hyperactivity/impulsivity

Hyperactivity/impulsivity were a risk factor for alcohol, fights, weapon carrying, inconsistent seatbelt use, drugs, and all injuries, independent of masculinity, which is consistent with the previous research showing how hyperactivity and impulsivity may be associated with students

being open to the use of substances, engaging in risks (91), lack of self-control, aggressive behavior and peer violence (92) as well as injuries (93).

A large body of research has shown that traditional understandings of masculinity are linked to impulsive behavior (94). In the present study, means scores of endorsement of traditional masculinity norms consistently increased as levels hyperactivity/impulsivity increased: boys who were more hyperactive/impulsive endorsed traditional masculinity norms to a greater extent than those who reported less hyperactivity/impulsivity. These results are in line with the theory that boys may see hyperactivity and impulsivity as part of their masculine identity (17), a way to align with Brannon and David's factors of masculinity, especially showing decisiveness, readiness to act, lack of fear and promptness to avoid what they may see as feminine caution (7). Further theorizing about these results, the case may be that boys are more hyperactive and impulsive are more sensitive to accepting the prevalent gender norms - maybe the boys who are more hyperactive/impulsive are more exposed to social influences due to their general sensitivity, or even have a lesser of the capability to formulate or diversify their own attitudes, views and standings from the prevalent social norms. Hyperactive and impulsive boys may also have a weaker understanding of their own emotions, so they mirror their emotional functioning against desirable models, as is the case of the desirability of emotional functioning through models that are generally accepted as being truly masculine. Possibly, boys who are more impulsive and hyperactive generally face more issues in establishing their own identity, so they align with what they know – desirable traits for man as a way into finding a grounded identity. But these theories merit future analysis.

Hyperactive/impulsive boys are at an elevated risk for their safety in comparison to those who are not. Future studies should include additional measures of masculinity to get a better understanding of the role it might play in the association between antisocial behaviors, affective disorders and hyperactivity and impulsivity as a whole. In detecting and treating hyperactivity and impulsivity related risk behaviors, researchers could use the endorsement of masculinity norms for prediction and intervention development. More in depth analysis of the associations between hyperactivity/impulsivity and masculinity in relation to other confounders is needed, regardless of the medium effect size of associations found through this study.

Depressive Mood

This study analyzed depressive mood by measuring three indicators: feelings of sadness or hopelessness, suicidal ideation and satisfaction with life. In the present study, one in five respondents expressed feeling sad or hopeless to an extent that they stopped doing some usual activities for two or more weeks in a row in the prior 12 months, and as high as one in nine expressed having had suicidal ideation in the same time period. These results are comparable with the previous studies (25). This finding may show that the methodology used in this study was well chosen, and that the indicators for the depressive mood adapted from the YRBS methodology used in the US are applicable for the cultural context in Croatia. The clinical implication for this could be that future studies could use the items adapted and translated for this study in exploring the dimensions of depressive mood. These findings also confirm the previous results, supporting the notion that over ten percent of boys in high schools have seriously considered suicide, which raises an alarm and demands interventions tackling mental health issues of adolescent young men in Zagreb, and possibly, the Croatian context as well.

Few studies have examined the association between depressive symptoms and multiple risk behaviors (95). In the present study, feeling sad and hopeless and satisfaction with life were generally not related to risk behaviors or injuries. Suicidal ideation was associated with a reduced risk for most risk behaviors. These results reinforce the notion that more research is needed to understand the potential public health impact of depressive symptoms on health risk behaviors and injuries. However, the results could also indicate that boys who engage in multiple risk behaviors have an issue with recognizing or admitting their depressive mood. They may perceive admitting depressive mood as being a sign of weakness.

This study did not have an hypothesis about the effect of depressive mood on masculinity, but with the psychological explanations for men's higher suicidal mortality being unsatisfactory (96), the study's logical framework implied that greater endorsement of traditional masculinity norms would be associated with more suicidal ideation, depression being at the center of suicidal behavior. Promising results from the literature demonstrate that the traditional masculinity may be a risk factor for suicidal behavior among adults (97).

Opposite to what was expected, no significant associations between feelings of sadness and hopelessness and endorsement of traditional masculinity norms were identified. In the present study, the boys who scored highest on masculinity also scored highest on satisfaction with

life. Further, the results of this study did show that the boys who reported suicidal ideation, most serious of the three measures for depressive mood, were endorsing traditional masculinity norms to a lesser extent than those that did not.

Normative emotional socialisation of boys, requiring men to conform to the norm of restrictive emotionality, might have played a role in reporting and on the overall result of the present study, which merrits more investigation. Some authors argued that "boys are caught in gendered confusion how emotional distress is communicated" (98). What is done to achieve appropriate masculine presentation can depend on the context, which can vary significantly in the way emotional distress is accounted for by men (99). While indeed boys who endorse traditional masculinity to a greater extent could be more self-reliant to navigate in depressive narratives, more work is needed to understand the association between self-reliance as a pillar of traditional masculinity and suicidal ideation among adolescents. This could also explain why feelings of sadness and hopelessness were not associated with greater expression of traditional masculinity norms and suicidal ideation and satisfaction with life on the opposite to what was expected.

Socioeconomic status

While the previous studies show that boys with lower SES would endorse traditional masculinity norms to a greater extent than those with a higher economic status, embodying the 'cool pose' in a defensive stance of their male identity (28), the results were the opposite: students in the lowest tertile of family affluence endorsed significantly less traditional masculinity norms than those in the medium and high tertiles. This is also the opposite to the results of a previous study using the MRNI, which showed that those men lower in social class were more like to endorse traditional masculinity ideology (100).

Higher socioeconomic status may bring benefits to those who have it, putting them into the position of power in certain aspects of life, over those of lower socioeconomic status and wealth. Similarly, endorsement of traditional masculinity norms may be awarded socially through greater access to power, through acceptance in the male peer group, as well as dominance, not only over female counterparts as a genuine trait of traditional masculinity, but also over other males that are perceived as less manly because of weaker enactment of the masculine role. Theoretically, the results may indicate that access to power in one dimension, such as the socioeconomic status, enables, supports and motivates the access to power in other dimensions, specifically, the gaining power through the traditional masculine dimension.

Therefor, more studies need to understand if this power play can be understood as intersected syndrome of power within peer groups, and, as such, if it would be associated with multiple health risk behaviors otherwise associated with masculinity norms endorsement, as shown through the results of this study.

More research is needed to understand how masculinity and socioeconomic status are intertwined, and how differing socioeconomic circumstances inform the construction, embodiment, and enactment of masculinity. This information may lead to the understanding of how relations between masculinity-related constructs and socioeconomic factors conjointly influence the occurrence health-risk behaviors and injury events. A limitation should be mentioned here – the effect sizes of the associations between masculinity and the family affluence were very small, and the conclusions based on the results of this study should be made carefully.

Microenvironment and macroenvironment

A novel aspect of this study was the assessment of how endorsement of masculinity norms varied across different school types. Schools with predominately male students harbored stronger endorsement of traditional masculinity norms; specifically, boys from vocational male schools endorsed traditional masculinity norms to a greater extent than those boys going to mix-gender grammar schools.

There are several ways one may understand these findings. First, interaction between boys and girls may be important for young men to better grasp the real dynamics of gender interactions and sex roles than the one perceived indirectly, through their predominately male group surrounding them while in predominately male schools (53). While unquestionably young men from predominantly male school do interact with girls and women elsewhere, when in school, they put on the mask of the dominant milieu, a mask demanding strict enactment of male roles. Further, this survey was filled in in schools and boys might have had bias in reporting their masculine attitudes simply because being inside of the milieu of masculinity, feeling under threat of being discovered to report less masculine traits, due to the predominately male surrounding, fearing from being penalized if their responds somehow go public (despite the assurance of privacy as an integral part of the study layout). Finally, predominately male schools are very much of that structure because of invisible social directing of professions, so professions that are perceived as being male, may carry with them

the aura of the needed character that goes with the role, the real male to go with the role of the male profession character responding mores strongly to traditional masculine norms.

School is the most formal institution in the lives of adolescents, offering a contemporary milieu for the teen years, in which young people define their gender roles (101). This research further indicates that masculinity is expressed more in strictly male school environments and that different constructions of masculinity may be present as a function of the school type.

Boys' endorsement of masculinity did not differ by the respondents' habitat (urban vs. rural) so no conclusions on the embodiment of urban or rural masculinity could be drawn from this study. This may be understood through the prevalence of social norms – in the age of global media and social networks, we may see little difference in the youth culture between urban and rural youth. This stands for gender roles and expectations as well – being a part of one community brings similar expectations, regardless if the environment we are raised in is more urban or rural. Further, boys from rural backgrounds may take on the urban identity, including the enactment of gender roles, as they proceed in their schooling to high schools in the city centers. These findings merit more direct investigation of the prevalent gender norms in differing environments, from a more genuine standpoint, focusing on populations that spend most of their time and are more vividly connected with their habitat, including through educational institutions. A study focused on youth in schools in the city of Zagreb obviously lacks that perspective.

Masculinity and Health-Risk Behaviors

Alcohol. An association of the endorsement of traditional masculinity and alcohol use was confirmed, in line with the theory and research suggesting that masculine norms might contribute to alcohol use through peer pressure and general conformity to adult norms (102). Drinking alcohol may be a way young man prove themselves to the group: they show their lack of fear for doing something prohibited, something dangerous, something adult. Drinking alcohol may very well be the best example why endorsement of traditional masculinity norms can be toxic, both metaphorically and directly. Drinking may lead to intoxication as well as social problems, including dependence that spirals into adulthood. By identifying the greater capacity to drink with the traits of "true" masculinity, and by endorsing these traits and living them up, young men are indirectly affected by traditional masculinity with alcohol as a vehicle. Results imply that changing the social norms around masculinity with boys may lead to a more successful prevention of alcohol abuse. Boys drink, and they do so a lot, and

drinking affects their lives, so the transformation of masculinity just may very well be a creative approach, a new entry point to the prevention of alcohol abuse.

Alcohol use and other risk-taking behaviors such as substance use emerge in adolescence and tend to cluster together (103). Alcohol consumption is a significant health problem. A large study of working adults showed that one in ten deaths were due to alcohol (104). Similar to the ESPAD study, almost half of the respondents in the present study got drunk in the month prior to the survey (105). When comparing the study results to the ESPAD study, a larger proportion of respondents from the present study reported drinking in the prior month (73%) than in the ESPAD study (57%), which consisted of national sample. Based on these results, it is possible that boys in Zagreb drink above the average of their peers in the rest of Croatia. Also, given that this study did not include a representative sample of students from Zagreb (as impressive and large the sample was), there is a possibility that by randomizing students for a future study the results would be more even with the national ones.

Psychoactive Drug Use. Greater endorsement of traditional masculinity norms did not predict the use of some of the most common psychoactive substances: non-prescribed prescription drugs, air fresheners (new psychoactive substance) or marihuana. However, the study did confirm that boys used inhalants during their lifetime where more likely to endorse traditional masculinity than those who did not use inhalants. The interpretation of these findings could be that, out of the few, inhalant use is considered the "riskiest" of the drugs, so it aligns with the risk-taking behavior "demanded" by the traditional masculinity norms. Theoretically, smoking marihuana, new psychoactive substances or even prescription drugs, may not be perceived as manly enough – in this case, endorsement of traditional masculinity may carry a very isolated protective role, but only if the other risks this construct carries are disregarded, such as the inhalant use, mentioned here.

The ESPAD study, conducted with second graders of high schools in Croatia in 2015 (105), showed that 24% of young men used marihuana in their lives. The present study, conducted between both the second and the third graders, showed even higher proportion of boys smoking marihuana, 40%. The results of the present study indicate that boys from Zagreb schools consume marihuana above the average of their peers on the national level. Again, having in mind the representativeness of the present study, one must be careful in reading these results. Still, the results do confirm the existing (worrisome) trend of cannabis use among youth in Croatia, regardless of the methodological setbacks.

In the present study, 16% reported using new psychoactive drugs, more than in the ESPAD study (7% of boys). The use of the new psychoactive drugs is in both studies well above the European average (4%) and needs to light an alarm for all future prevention (105). Similarly, the results of the present study indicate reports of non-prescription drug use with the present sample (16%) was higher than in the ESPAD study, where 3% of boys reported using sedatives and 7% reported using analgesics to achieve mood change (105). Besides previously mentioned difference in the sampling method between the present study and the ESPAD one, it should be taken into consideration that the methodology for determining the prevalence in the present study was different than the one used in the ESPAD methodology. More investigation of the YRBS study validity for the Croatian context may be needed to understand the differences seen in the substance use results of this studies, contrary to the ESPAD study.

The study also investigated the use of other psychoactive substances. It was found that many boys report having used some drug in their lifetime. Prevalence was higher than reported in the results for Croatian from the ESPAD study (105). Again, this highlight that boys from Zagreb schools report drugs use above the national average. Furthermore, compared to the YRBS results for high school students in the US for 2015, Zagreb students reported using drugs to a greater extent than their peers in the US (106). This study offers a first comparison of substance use among students in the two countries using the same YRBS methodology. While this study confirms that more Croatian high school students reported using drugs than students in the US, it offers little explanation on the reason for this phenomenon, suggesting the need for further research. A possible explanation might be the simple one – reading the results as they are, prevention efforts for the Croatian context might look into the interventions used in the United States in achieving the lower prevalence of drug use, than the case in Croatia. For further comparisons, subsequent cross comparison of the trends in drug use between Croatia and the US are necessary.

The study results further demonstrate the high prevalence of inhalants among boys in Zagreb: 12% of respondents reported using inhalants. This proportion, however, is lower than in the ESPAD study, in which 19% of boys reported consuming inhalants (peaking Croatian national results among all the European countries). The present study comes in an important moment. According to the ESPAD study, Croatia was the country with the highest proportion of students who have tried inhalants in Europe: 25% of adolescents tried them (107). While

taking into consideration the methodological differences, it is possible that some milestones have been achieved recently in reducing the problem of inhalant use in Croatian teens, which merits more investigation. However, given the short time between the two studies, it is more likely that the lower reporting of inhalant use in the present study is due to the methodological variation between them.

Fights and Weapons. Greater endorsement of traditional masculinity was associated with being in fights and carrying weapons and predicted these behaviors. Fighting is part of boys' lives and socialization – and it gets *bloody*, often taking place in schools. The results of the present study implicate that one-third of boys fought in the year prior to the survey. According to the 2013/2014 HSBC study, 14% of boys aged 15 had been involved in a physical fight at least three times in the last 12 months (25). In the present study, 23% of boys from the study sample participated in 2 or 3 fights in the same period. Particularly worrisome are the results from fighting that took place at the school property. Results show that 12% of students from the present study reported fighting on the school property in the prior year.

Young men may be particularly sensitive to cultural influences on masculinity that glorify violence (108, 109). Shifting the ways men interact with each other from an early age towards nonviolent interactions opens a new venue for prevention of violence, by changing the narrative of what makes a man in the broader society. School violence is preventable; the research shows that prevention efforts—by teachers, administrators, parents, community members, and even students—can reduce violence and improve the overall school environment (110). School-based interventions that question the relation between masculinity and violence may very likely present a niche for the prevention and eradication of fighting and weapon carrying among boys in schools.

Lack of Traffic Protection. When driving or riding in a car, seatbelts are the basics of car safety. The use of safety belts is the single most effective means of reducing fatal and nonfatal injuries in motor vehicle crashes (111). Bicycle helmets are a proven intervention that reduces the risk of bicycle-related head injury by about 80% (112).

Greater endorsement of traditional masculinity norms was associated with reckless transport-related behavior in the form of inconsistent seatbelt use when driving on the front seat car and not wearing helmets when riding a bike. The present study revealed troubling results related to boys' transport related behaviors: over half of the respondents reported not wearing a

seatbelt when driving on the front seat regularly. The present study also revealed that nine of ten boys who rode a bicycle reported never wearing a helmet.

According to a 2016 meta-analysis, school-based training and education on seatbelt use and helmet use have had limited impact (113). The results of the present study can help guide the development of interventions at the national level. Health promotion programs often lack a clearly specified theoretical foundation or are based on narrowly conceived conceptual models (114). Cultural dimensions of the environment have the potential to influence a variety of health outcomes (114); traffic is an environment, a stage for boys to establish themselves as individuals who are appropriately masculine (115). Present study reinforces the importance of remodeling traditional masculinity as a cultural and environmental risk factor when developing traffic safety interventions.

Traffic related injuries and deaths are at a steady decrease in Croatia for years; still, vehicle crashes are still the leading cause of death for children and youth (116). In the age of the present sample, boys are not legally allowed to drive, so transport safety related behaviors were questioned by asking the respondents about what is relevant for their age: questions on wearing a seatbelt while driving in a car sitting on the front seat and wearing a helmet when riding a bicycle.

Speed, ability and risk-taking, such as inconsistent seatbelt use or refusal to wear a helmet when cycling, might be what some boys interpret to constitute being a "real man" in traffic. Furthermore, the role of the aggression (in this study analyzed as a dimension of the traditional masculinity) is widely recognized as a "risk" in the transport related behavior (117). Previous research showed that the greater endorsement of masculinity can predict multiple risky transport-related behaviors, such as aggressive and reckless driving among older boys and men (74).

Masculinity and Unintentional Injury Events

A direct link between masculinity and most of the injury events was not proven, except, in the case of spraining or extending a joint/ankle or having an injury of bones or muscles, which, as study showed, were associated with a greater endorsement of traditional masculinity norms. In line with the gender role strain paradigm used as a theoretical framework for this study (6, 118), the author hypothesized that boys endorsing *macho* attitudes will also reinforce physical toughness (e.g., showing higher tolerance for pain, engaging in fights, competing in sports)

(119), put themselves to more direct risks and in this way be more exposed to direct risk, resulting in higher rates of reported injury events.

While the previous research examined injury events that needed medical treatment, the present study requested information about all of the injuries that occurred in the prior year. Almost all respondents (93%) reported some type of injury; in comparison, the HSBC study for 2013/2014 showed that less than half (45%) of boys aged 15 reported having at least one injury that was medically attended, in the prior year (25). Further on, previous evidence from a major city in Croatia showed that falls were the most common injuries treated in the emergency ward (57%), followed by traffic-related injury events (7%) (51). In the present study, cuts were most frequently reported injury events (72%), followed by falling (68%), getting burned (56%), being hit or attacked (49%), spraining an ankle (48%) and participating in some kind of traffic accident, with or without a car (11%).

Spraining or extending a joint/ankle or having an injury of bones or muscles is frequently related to sports. Sport has the potential for injurious outcomes. It can be an environment in which notions of masculinity are reinforced and naturalized, valuing physical dominance. Male involvement in physically hazardous sports is often taken for granted, considered natural, and even appealing (120).

Getting burned was associated with lower endorsement of traditional masculinity. The most likely source for minor burns that do not require medical treatment is cooking. Although everyone needs to eat several times a day; traditionally, cooking is perceived as more "feminine." Thus, students who endorse traditional masculinity may not be cooking.

More research is needed examining the relation between serious injuries and endorsement of traditional masculinity. In addition, more studies are needed that whether endorsement of traditional masculinity hinders the reporting of less *macho* types of injuries.

Limitations

This study had some limitations. This study is cross-sectional and, thus, does not provide evidence of a temporal or causal association. Although all schools in Zagreb were invited to participate, two-thirds declined participation. Students in these schools may differ from those who participated. No systematic bias is foreseen, but reasons for non-participation was not explored. However, the sample of this study is large and derives from diverse types of schools (vocational, grammar), which strengthens the results. Although the study would have

benefited from using a depression scale, the study only measured feelings of sadness or hopelessness and suicidal ideation. However, the YRBS in the United States uses this same item as an indicator of depression. Logistic regression was used to analyze the associations between masculinity and health behaviors and injury events. In an initial conversation with the author of the masculinity scale (Levant), he proposed to use the structural equation modeling; however, this method was out of the reach of the research team at the moment the study was conducted. While this study would have benefited on the section on the validation of the traditional masculinity scale used in this research for Croatian language, this work is outside of the scope of this dissertation.

The effect sizes between masculinity and health risk behaviors and injuries were modest. In social sciences, however, scientists do not expect that a single behavior, cognition, family situation, or mental health status will account for all the effect on the health outcome. Thus, intervention programs could be strengthened by addressing traditional masculinity as one of those factors.

Although the hypothesis was written in a way that adolescent boys 16 and 17 years of age would be included in the study, this study finally used a slightly bigger age range, but this does not change the characteristics of the sample.

Every statistical method has limitations: the odds ratio used in this study, also referred to as the prevalence odds ratio in cross-sectional studies, may overestimate the strength of association in comparison to risk ratio; however, evidence show that the direction/trend of the association remains the same when calculating risk ratio (121); researchers should use caution and have in mind potentially higher estimates of p-values for odds ratios.

7. CONCLUSION

Given the high rates of problems boys face and act out in their lives such as aggression, violence, substance abuse, and suicide, the educational efforts need to be responsive to the needs of boys (62). Only a full understanding of young men's' contexts and identities provides adequate depth for relevant design of public health interventions directed at improving the health of this vulnerable group. This study based on a large and diverse sample of adolescents from Zagreb and surrounding areas, established links between endorsing traditional masculinity norms and behaviors that compromise health. This study is one of the few in Croatia to examine the social constructs related to gender among boys and the only one that examines how they influence health risk behaviors and injuries. Thus, the study opens a venue for prevention. The present study makes three valuable contributions to research:

First, the development of the Croatian version of the MRNI-A-r for measuring the endorsement of masculinity norms among adolescent boys in Croatia. This study also sets new standards for the adaptation and translation of measurement instruments. The diversity of participants involved in the process was the first and unique for Croatia, including the community committee and student groups who participated in focus groups for adaptation and the pretesting of the measurement tool.

Second, the way that adolescent boys' endorse traditional masculinity norms depends on their personal characteristics and environmental factors. Through this, this study advances scientific knowledge of the prevalence of health-risk behaviors and injuries and of individual and environmental factors associated with them.

Third, expressed attitudes endorsing traditional masculinity norms measured through five dimensions (avoidance of femininity, self-reliance, aggressive dominance, achievement/status and restrictive emotionality) are a significant predictor of behaviors that present risk for safety among high school students from the City of Zagreb aged 16 and 17.

As a whole, the findings from this study provide evidence of the value of gender sensitive approach in prevention of health-risk behaviors. Research is needed on the relation between masculinity and depressive mood, as well as the influence of family affluence. Studies that research masculinity from puberty to young adults would provide information about how this construct changes over time.

While the associations between masculinity and most health risk behaviors, as well as some injury events, were significant in this study, the effect sizes of these associations were small. However, this study did not aim at proving that the endorsement of traditional masculinity norms is the sole cause of health risk behaviors or injuries, but rather one of the contributors. What is important is that endorsement of traditional masculinity norms, as a specific contributor, is one that is open for interventions. The goal of this study was not to prove that transformation of masculinity into a less toxic model is a magic swan that will prevent all the hazards adolescents face in their path to adulthood. It did indicate, however, that by making preventive programs more gender transformative, they could be more successful, which needs to be tested through future experimental design studies. This recommendation is in line with the concurrent recommendations for designing preventive programs, including the recently published APA guidelines for Psychological Practice with Boys and Men (62). This research provides evidence for the value of challenging toxic masculinity in prevention programs in the Croatian schools.

8. ABSTRACT IN CROATIAN

Značenje tradicionalne maskulinosti u predviđanju ozljeda i nesreća adolescenata muškog spola

Ponašanja mladića vezana uz zdravlje dio su mreže rodno uvjetovanih odnosa i struktura u društvu. Ova ponašanja povisuju rizik ozljeda. Štetne percepcije maskulinosti mogu povećati (nepotrebnu) ranjivost mladića i kao i njihov morbiditet i mortalitet.

U ovoj presječnoj studiji s preko 2000 učenika iz različitih škola u gradu Zagrebu analizirana je povezanost izraženih stavova prema tradicionalnoj maskulinosti s osobnim i okolišnim faktorima, ponašanjima koja predstavljaju rizik za zdravlje i ozljedama kod učenika srednjih škola. Korištena je hrvatska verzija upitnika *Male Role Norm Inventory-Adolescent-revised (MRNI-A-r)* kako bi se analizirale norme vezane uz tradicionalnu maskulinost i vjerovanja o ponašanjima primjerenim za dječake adolescentne dobi.

Snažnije podržavanje tradicionalnih normi maskulinosti bilo je povezano s ponašanjima koje mogu dovesti do ozljeda i smrti: korištenjem alkohola i droge, tučnjavom i nošenjem oružja i nedostatkom zaštitnog ponašanja u prometu. Istraživanjem nije demonstrirana povezanost viših rezultata na instrumentu *MRNI-A-r* s najprevalentnijim događajima vezanim uz ozljede.

Podržavanje normi tradicionalne maskulinosti može se koristiti za bolje prepoznavanje mladića koji su pod najvećim rizikom od upuštanje u ponašanja koja predstavljanju rizik za zdravlje. Moguće je da promjena načina kako adolescenti podržavaju norme tradicionalne ima potencijal za smanjenje učestalosti ponašanja koja predstavljaju rizik za zdravlje kod mladih u Hrvatskoj.

9. ABSTRACT IN ENGLISH

Significance of traditional masculinity for the prediction of injuries and accidents in male adolescents

Natko Gereš, 2019

Young men's health-related behaviors are part of a network of gendered relations and structures in the society. These behaviors increase the risk from injuries. Harmful notions of masculinity may increase the (needless) vulnerability of young men and increase their morbidity and mortality.

The association between expressed attitudes toward traditional masculinity norms and personal and environmental factors, health-risk behaviors, and injuries among high school students was analyzed in this cross-sectional study with a sample of over 2000 students from diverse schools in Zagreb. The Croatian version of the Male Role Norm Inventory-Adolescent-revised (MRNI-A-r) was used to analyze traditional masculinity norms and beliefs about appropriate behavior for adolescent boys.

The greater endorsement of traditional masculinity norms was associated with behaviors that may lead to injuries and deaths: alcohol and drug use, fighting and weapon carrying and lack of traffic protection. This research failed to demonstrate that greater scores on the MRNI-A-r scale were associated with the most prevalent injury events.

The endorsement of traditional masculinity norms may help identify young men more likely to be involved in behaviors that have the potential to cause injuries and death. Changing how male adolescents endorse traditional masculinity may have the potential of reducing health risk behaviors of youth in Croatia.

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11. CURRICULUM VITAE

Natko Gereš was born in Zagreb, where he finished elementary school. He finished 7th Grammar school in 2002 and the same year started his studies in the University of Zagreb School of medicine. During his studies, he worked as a demonstrator in the Physics and biophysics department. He finished the School of medicine in 2009, and did his obligatory internship in the Institute for emergency medicine of the City of Zagreb. In 2010 he started working in the same institution as a medical doctor in the team. Later in the same year, he founded the NGO Youth organization Status M, where he worked as a director. In 2014 he started working in International NGO Promundo as a program officer.

He consulted several UN agencies and the World Bank and held a practicum for Johns Hopkins University School of Advanced International Studies. He spoke in front of the General Assembly of the Commission on the Status of Women, for which he was commended by the Ombudsperson for Gender Equality of the Republic of Croatia.

In 2013 he enrolled Biomedicine and health PHD studies at the University of Zagreb School of medicine, with the thesis theme accepted in 2015. He won the best work award for the 2017 PHD Day in the field of Public Health. During his studies, he frequently visited the department of Health Promotion and Behavior, College of Public Health, University of Georgia.

In 2013 he started his studies at the Public health postgraduate university study in the same institution, studies he is currently finishing.

In 2018, he started his Psychiatry residency at the St John's psychiatric hospital in Zagreb, where he works now.