



# Gender disparities in attitudes, norms, and perceived control related to intentional condomless sexual intercourse: A psychosocial theory-driven comparison among cisgender heterosexual male and female college varsity athletes in Taiwan

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## ABSTRACT

**Background:** While condom use has been extensively studied as a protective behavior, research directly focusing on condomless sexual intercourse (CSI) as a distinct and intentional risk behavior, particularly regarding gender differences, remains scarce.

**Methods:** Building upon the Theory of Planned Behavior (TPB), this study addresses this gap by comparing TPB factors and individual TPB items regarding intentional CSI among cisgender heterosexual college varsity athletes in Taiwan ( $N = 1348$ ).

**Results:** High CSI intention was more prevalent among men (53.6 %) than women (31.7 %). Our expanded TPB framework identified five distinct TPB factors pertaining to attitudes, norms, and perceived control. Multivariate logistic regression analysis demonstrated that all five TPB factors were significantly associated with CSI intention among men, but only three among women. Notably, our factor analysis differentiated attitudes toward positive/negative outcomes of CSI and perceived control under facilitating/constraining conditions, revealing attitudes toward positive outcomes of CSI as the strongest driver of CSI intention among both men (AOR = 2.51–4.09) and women (AOR = 3.79–5.71). Further analysis of TPB items disclosed that men prioritized psychological pleasure (AOR = 2.18), whereas women exhibited a “partner-centered” tendency, emphasizing trust by sex partners (AOR = 3.43).

**Conclusions:** Overall, men exhibited more favorable views toward CSI than women, with gender differences evident in the differential associations of varying TPB factors and items with CSI intention. Future research could explore the development of these differential attitudes, norms, and perceived control concerning CSI. Given the modifiable nature of TPB variables, our study’s insights can inform actionable strategies and targeted interventions tailored for young men and women.

## Introduction

### *Unprotected sex as a leading behavioral risk factor for college-age youths*

Sexual health among young people has arisen as a global health concern, as its changing trends have the potential to jeopardize future population health. According to the most recent *Global Burden of Disease Study 2019*, unprotected sex rose from the 8th to the 3rd rank, from 1990

to 2019, as a leading risk factor for attributable disability-adjusted life-years among young people aged 10–24 years ([GBD Risk Factors Collaborators, 2020](#)). Another study specifically focusing on young people also found that, for those aged 15–24 years, unprotected sex emerged as the second leading global risk factor for death in 2013 ([Mokdad et al., 2016](#)). Evidently, youth health has been profoundly impacted by unprotected sex.

Unprotected sex also contributes to increased medical expenditures.

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A study conducted in the U.S. estimated that the direct lifetime medical costs of newly acquired STIs in 2018 amounted to \$15.9 billion, with the majority attributed to sexually acquired HIV (86.2 %) (Chesson et al., 2021). Notably, individuals aged 15–24 accounted for 26.4 % of the costs associated with incident STIs, underscoring the pivotal role of this young population in STI/HIV prevention. In a parallel context, the latest statistics from the Taiwan Centers for Disease Control (Taiwan CDC) in 2024 also indicated that 26.6 % of HIV infections occurred among youths aged 15–24, with over 93 % of new cases attributed to unprotected sex (Taiwan CDC, 2024). These concerning trends highlight the vulnerability of college-age youths to sexual risk behaviors.

#### *Sexual risk behaviors among college students and athletes*

While there are no existing surveillance reports specifically focusing on sexual health behaviors among Taiwanese college students, the Taiwan Youth Project, a cohort study, estimated that around 28.1 % of college students had been involved in premarital sexual activity by the age of 22 (Chiao et al., 2012). Among the few other studies that provided prevalence estimates of unprotected sex among Taiwanese college students, varying levels of consistent condom use, ranging from 11.9 % to 31.4 %, indicate a prevalent lack of protected sexual practices in this young population (Tung et al., 2011, 2009; Wang, 2016). Despite the inherent variability across these studies due to differing measures and sample sizes, these data collectively underscore the vulnerability of Taiwanese college students to sexual risk behaviors.

Within the college student population, college varsity athletes shoulder a distinct dual role as both students and athletes, requiring them to endure the pressure from both academic studies and athletic competition (Settles et al., 2002). Similar to the three divisions of the National Collegiate Athletic Association (NCAA) in the U.S., varsity sports in Taiwan operate within a two-tier system. Tier-one athletes are students who major in athletics or sports-related fields, while students from all other academic disciplines compete in tier-two games. As a result of intense training, some research has suggested that college athletes' physiques might make them more attractive and lead to more sexual encounters (Faurie et al., 2004). Indeed, supporting these propositions, college athletes have been found to have more frequent sexual activities and more sex partners than their non-athlete counterparts (Grossbard et al., 2007; Wetherill & Fromme, 2007). A national study specifically focusing on NCAA college athletes also disclosed that men exhibited significantly higher prevalence of unprotected sex (10.2 %) and multiple sex partners (14.6 %) than women, whose prevalence was 7.9 % and 9.3 %, respectively (Huang et al., 2010). This body of empirical evidence underscores the need to further investigate sexual risk behaviors and gender differences among college athletes. However, there has been a lack of research in the published literature exploring unprotected sexual behaviors among college varsity athletes in Taiwan.

#### *Different perspectives: condom use versus condomless sexual intercourse*

Sexual behavior can be viewed from a protective versus risk behavior perspective, such as condom use versus condomless sexual intercourse (CSI). Since condom use is considered an effective way to prevent pregnancy and STIs, much research among youths has focused on condom use as a protective behavior. By contrast, CSI per se as a distinct and intentional risk behavior has been relatively understudied. It is noteworthy that intentional CSI is not simply inconsistent condom use or lack thereof but involves deliberate engagement in a distinct form of sexual risk-taking. Intentional CSI refers to instances where individuals consciously and intentionally choose to engage in penetrative sexual intercourse without using condoms, even in situations where condoms may be readily available.

Notably, although intentional CSI and not using a condom both result in condomless sex, the key difference lies in the intent behind the behavior. Intentional CSI underscores a conscious decision and reflects a

planned behavior to engage in condomless sex. Thus, it is arguable that focusing on CSI intention rather than condom use can be a more direct and informative approach to help elucidate the intricate psychosocial and situational factors influencing this reasoned action of risky sexual behavior. Accordingly, valuable insights can be gained to guide the development of targeted interventions to reduce such sexual risk-taking.

#### *Applications of the Theory of Planned Behavior in sex research*

Considering the pivotal importance of behavioral intention in the conscious decision and deliberate engagement in intentional CSI, the Theory of Planned Behavior (TPB) can provide an overarching theoretical framework to guide this study. TPB is a widely used behavior change theory that can explain and predict behavioral intention and behavior (Ajzen, 1991; Painter et al., 2008). TPB posits that one's behavior is best predicted by behavioral intention, which is influenced by three constructs: Attitude Toward the Behavior (ATB), Subjective Norm (SN), and Perceived Behavioral Control (PBC). Higher scores in these constructs are associated with greater behavioral intention. Meta-analytic reviews of TPB-based research have also demonstrated that TPB can prospectively predict and explain 19.3–27.0 % and 39.0–44.3 % of the variance in health-related behavior and intention, respectively (Armitage & Conner, 2001; McEachan et al., 2011), hence providing a solid theoretical foundation for our study.

Given behavioral intention's critical role in TPB as the primary determinant of behavior, it has garnered significant research interest and been frequently employed as an outcome variable in TPB-based studies, as evidenced by the aforementioned meta-analytic reviews. Further, an extensive meta-analysis of 206 TPB-based studies concluded that behavioral intention could prospectively predict future behavior (McEachan et al., 2011). Specifically, in regard to condom use behavior, this meta-analysis revealed a robust prospective relationship between intention and future behavior, with a corrected mean true score correlation (i.e., mean rho) of 0.37, representing a medium-to-large effect according to Cohen's classification of effect sizes (Cohen, 1992). While the meta-analyzed studies were not focused on CSI, the analysis lent support to the use of TPB and behavioral intention in sexual behavior research.

Within the context of sexual behavior research, behavioral intention is an important outcome variable, given its pertinence to a critical research question concerning intent and self-estimated likelihood of future engagement in a specific sexual behavior, such as CSI. Moreover, it should be underscored that, regardless of prior behavioral experience or lack thereof, individuals can always choose to initiate or repeat this behavior in the future. This highlights the vital need to assess behavioral intention before actual behavior initiation or reoccurrence, especially for risk behaviors that bear serious, long-term, or even irreversible consequences, including HIV infection. Accordingly, exploring CSI intention can illuminate and deepen our understanding of the intricate decision-making processes associated with CSI. From a prevention perspective, leveraging the antecedent nature of CSI intention allows us to proactively devise interventions to address this risk behavior before it manifests. In light of these considerations, our study sought to explore CSI intention among college athletes, regardless of whether they had sexual experience prior to the survey.

While TPB has proven instrumental in predicting condom use intention among college students (Cha et al., 2008; Villarruel et al., 2004; Zhang & Jemmott, 2015), the utility of TPB as a theoretical framework to study CSI intention has been underexplored. However, it is noteworthy that the seminal work by Chu and Huang (2018) marked a pivotal moment in TPB-based research, successfully applying the theory to examine condomless anal intercourse intention among young men who have sex with men. While this study addressed a different sexual behavior within a distinct population, its shared emphasis on condomless intercourse provided a foundational endorsement for the broader use of TPB in a parallel exploration of CSI intention. Hence, this

expansion of TPB to study CSI intention among heterosexual individuals represents a promising and innovative approach in sex research, addressing an existing gap in the current literature.

### The current study

According to the sexual behavior literature examined above, college athletes face heightened sexual risks and thus might also exhibit high behavioral intention toward CSI, warranting dedicated research efforts. However, as reviewed earlier, there has been a paucity of literature focusing on CSI intention among college varsity athletes in Taiwan. Further, no published research has applied TPB to examine CSI intention within this particular population or expanded the use of TPB to study CSI intention among heterosexual individuals. Therefore, guided by TPB as the overarching theoretical framework, this study aimed to systematically examine TPB-based factors in relation to CSI intention among heterosexual college athletes. Specifically, in line with the tenets of TPB, we hypothesized that a more positive attitude toward the behavior, a more supportive subjective norm, and higher perceived behavioral control would be associated with greater CSI intention.

Moreover, in view of the gender differences in sexual risk behaviors noted previously, this study also aimed to compare CSI intention, TPB factors, and their associations by gender. Importantly, recognizing that these psychosocial constructs are shaped by individuals' lived experiences as men or women within their sociocultural context, they represent gendered attitudes, norms, and perceived control. Therefore, we posited that any observed gender differences were primarily attributable to gendered effects rather than inherent biological sex differences. Accordingly, we explored gender comparisons by disaggregating and analyzing the data separately for men and women. Elucidation of these differential relationships can offer valuable insights for future research and the development of gender-specific sexual risk behavior prevention programs tailored to the needs of men and women within this young population.

Lastly, concerning terminology use, it is noteworthy that, in alignment with the gender perspective of the current study, we refer to our participants as "men" and "women" throughout this article, signifying their gender identity. By contrast, the terms "male" and "female" are exclusively used to denote self-identified biological sex rather than gender identity.

## Methods

### Participants, recruitment, and survey administration

The participants in this study were college varsity athletes from three national universities in Taiwan. In consultation and collaboration with the Department of Athletics at each participating university, we obtained anonymous lists of student-athletes on varsity teams. Data collection times and locations were coordinated with the assistance of team coaches and were typically scheduled before routine team practices. Researchers then arrived as planned, bringing the appropriate number of pencil-and-paper questionnaires based on the varsity team lists.

Following the study protocol, researchers read a script to the athletes, explaining the study and recruiting them to participate. In addition to an introduction to the study and a description of its purpose, the script emphasized that participation was completely voluntary, all responses would remain anonymous and confidential, and voluntary completion of the questionnaire constituted the informed consent to participate, as reiterated on the cover page of the questionnaire. To minimize potential pressure on the athletes to participate, coaches were asked to leave the area temporarily during the data collection process, which lasted approximately 20–25 min.

Participants were incentivized with a popular snack item (valued at under \$1 USD) and the opportunity to enter an instant lottery for a

convenience store gift card (\$3.3 USD) upon returning their completed questionnaires. The survey was conducted from November 2014 to April 2015. The study protocol was reviewed and approved by the Research Ethics Committee of the National Taiwan University Hospital.

Of 1699 self-administered questionnaires distributed, 1652 responses were received (response rate: 97.2 %). Based on self-reported data on sex, gender, and sexual orientation, all participants were cisgender male and female athletes, including 1382 who identified as heterosexual individuals and 270 as sexual minorities (homosexual, bisexual, and unsure). Given that this study aimed to apply TPB to examine CSI intention specifically among heterosexual college athletes, our analysis focused exclusively on heterosexual participants. After 34 incomplete responses were removed, a total of 1348 cisgender heterosexual college athletes were included in the final analysis, comprising 906 men and 442 women.

### Measures

#### Outcome variable: condomless sexual intercourse intention

"Condomless sexual intercourse (CSI)" was defined as having penetrative sexual intercourse without using condoms. CSI intention was evaluated by one question: "Regardless of whether you are sexually experienced, how likely is it that you will engage in CSI, if and when you have sex within the next year?" Responses were provided using a 7-point semantic differential scale (SDS), with 1 indicating *Very unlikely* and 7 *Very likely* to have CSI. CSI intention was dichotomized into high versus low, using the median as the cutoff.

#### Explanatory variables: TPB factors and individual TPB items

The following multiple-item measures of the TPB constructs (Ajzen, 1991) were developed specifically for this study. Guided by the theory and the relevant TPB literature, the researchers initially generated the draft survey items. These items were then reviewed through interviews with several college varsity athletes who were invited to pilot-test the questionnaire. They evaluated the relevance, clarity, and appropriateness of the items and suggested additional salient beliefs for incorporation into the questionnaire. Based on their feedback, the measures were refined and finalized.

- Attitude Toward the Behavior (ATB) was assessed by 11 pairs of items, with each pair consisting of a "behavioral belief" and an "evaluation of the behavioral outcome" on a 7-point SDS. The former evaluates one's perceived likelihood of a certain outcome resulting from CSI (e.g., "CSI will result in sexually transmitted infections"), with 1 indicating *Very unlikely* and 7 *Very likely*. The latter indicates one's evaluation of the aforementioned behavioral outcome (e.g., "To me, resulting in sexually transmitted infections is..."), with -3 indicating *Very bad* and 3 *Very good*. The former was then multiplied by the latter to create an ATB item, scored from -21 to 21, with a higher score indicating a more positive attitude toward CSI. An exploratory factor analysis (described in the Procedure section below) was performed to examine the data structure of these TPB items and to develop factor-based scales. Accordingly, a scale score ranging from -21 to 21 was derived from averaging the constituent item scores and then trichotomized using tertiles as cutoffs—e.g., the ATB factor-based scale score was recoded into relatively negative/neutral/positive, for analysis as a TPB factor. The above-mentioned 11 ATB item scores were each dichotomized using the median as the cutoff into relatively negative/positive, for analysis as individual TPB items.
- Subjective Norm (SN) was assessed by 9 pairs of items, with each pair consisting of a "normative belief" and "motivation to comply" on a 7-point SDS. The former evaluates one's perceived support from a salient other regarding one's CSI (e.g., "If I engage in CSI, I think my coaches would be..."), with -3 indicating *Very*

unsupportive and 3 Very supportive. The latter assesses one's motivation to comply with the aforementioned salient other (e.g., "In general, I do what my coaches want me to do"), with 1 indicating *Strongly disagree* and 7 *Strongly agree*. Similarly, the former was multiplied by the latter to create an SN item, scored from -21 to 21, with a higher score indicating a higher level of perceived support for CSI. Like ATB, a factor-based scale score for SN was derived from averaging the constituent item scores and further trichotomized into relatively unsupportive/neutral/supportive, for analysis as a TPB factor. The above 9 SN item scores were also dichotomized into relatively unsupportive/supportive, for analysis as individual TPB items.

- (3) Perceived Behavioral Control (PBC) was assessed by 10 pairs of items, with each pair consisting of a "control belief" and "perceived power" on a 7-point SDS. The former evaluates one's perceived likelihood of a certain situation arising regarding CSI (e.g., "I use online social networking sites (e.g., Facebook) to find sex partners"), with 1 indicating *Very unlikely* and 7 *Very likely*. The latter indicates whether the aforementioned situation facilitates or hinders one's CSI (e.g., "If I use online social networking sites to find sex partners, then CSI will be..."), with -3 indicating *Very difficult* and 3 *Very easy*. Similarly, the former was multiplied by the latter to create a PBC item, scored from -21 to 21, with a higher score indicating a greater sense of control over CSI. Like ATB, the PBC factor-based scale score was derived from averaging the constituent item scores and then trichotomized into relatively low/intermediate/high, for analysis as a TPB factor. The above 10 PBC item scores were also dichotomized into relatively low/high, for analysis as individual TPB items.

**Control variables: background characteristics**

In addition to self-identified sex and gender, we inquired about the following background characteristics and included them in the multivariate analysis as control variables, considering that they are not only descriptive of the college population but also plausibly relevant to CSI: year in college (1st, 2nd, 3rd, 4th), living arrangement (home, dormitory, rented housing), religion (Buddhist/Taoist, Christian, none), relationship status (single, in a relationship), and number of sex partners in the past year (no sexual experience, 0, 1, ≥ 2).

**Data analysis procedures**

First, an exploratory factor analysis was performed to explore the underlying data structure of the aforementioned 30 individual ATB, SN, and PBC items. Factors were extracted using the principal component method with an oblique rotation (promax). Following general recommendations and commonly accepted practices in the social and behavioral sciences, only items with a meaningful factor loading of 0.40 or higher were retained, and if any such items cross-loaded on more than one factor, they were removed from the factor analysis (Pituch & Stevens, 2015).

The 30 TPB items in this study all exceeded the 0.40 threshold, and without any cross-loading, they were found to have a five-factor structure in keeping with the TPB constructs (Cheng & Huang, 2018; Chu & Huang, 2018; Huang & Huang, 2020). Accordingly, five factor-based scales were developed. Each of their internal consistency reliability was also assessed using Cronbach's  $\alpha$  as follows (Table 1): (1) ATB about positive outcomes (6 items;  $\alpha = 0.87$ ); (2) ATB about negative outcomes (5 items;  $\alpha = 0.84$ ); (3) SN (9 items;  $\alpha = 0.93$ ); (4) PBC under facilitating conditions (6 items;  $\alpha = 0.75$ ); (5) PBC under constraining conditions (4 items;  $\alpha = 0.75$ ). Jointly, these five factors explained 61.43 % of the variance. In addition, the Kaiser-Meyer-Olkin measure of sampling adequacy (0.904) exceeded 0.60 and Bartlett's test of sphericity ( $p < 0.001$ ) was significant, both meeting the standards required for factor analysis.

Second, distributions of background characteristics, CSI intention,

**Table 1**  
Factor analysis of TPB items.

TPB item	Factor				
	I	II	III	IV	V
<b>I. ATB about positive outcomes</b> (Cronbach's $\alpha = 0.87$ )					
CSI can increase sexual excitement		0.86			
CSI can enhance psychological pleasure		0.90			
CSI can increase the sense of accomplishment		0.80			
CSI can make me feel trusted by my sex partner	0.81				
CSI would make me perceived as sexually attractive		0.83			
CSI can avoid penile discomfort caused by wearing a condom	0.50				
<b>II. ATB about negative outcomes</b> (Cronbach's $\alpha = 0.84$ )					
CSI will result in sexually transmitted infections			0.72		
CSI will result in unintended pregnancy			0.74		
CSI will make me feel guilty			0.81		
CSI violates my personal values			0.81		
CSI will cause psychological burdens			0.82		
<b>III. Subjective norm</b> (Cronbach's $\alpha = 0.93$ )					
I think my significant other would support me engaging in CSI				0.42	
I think my father would support me engaging in CSI				0.86	
I think my mother would support me engaging in CSI				0.84	
I think my brothers and sisters would support me engaging in CSI				0.90	
I think my coaches would support me engaging in CSI				0.86	
I think my professors would support me engaging in CSI				0.85	
I think my classmates would support me engaging in CSI				0.83	
I think my close friends would support me engaging in CSI				0.85	
I think my online friends would support me engaging in CSI				0.77	
<b>IV. PBC under facilitating conditions</b> (Cronbach's $\alpha = 0.75$ )					
I use online social networking sites (e.g., Facebook) to find sex partners				0.66	
I participate in orgies				0.64	
Buying condoms makes me feel embarrassed				0.49	
I am not able to use condoms correctly				0.70	
I am allergic to latex condoms				0.79	
I am not able to get condoms that fit				0.78	
<b>V. PBC under constraining conditions</b> (Cronbach's $\alpha = 0.75$ )					
I can buy condoms conveniently					0.76
I have condoms close at hand when needed					0.84
I can get preferred condoms (e.g., thinness, flavor, texture)					0.70
My sex partner demands that I use a condom					0.66

CSI: condomless sexual intercourse; TPB: Theory of Planned Behavior; ATB: Attitude Toward the Behavior; PBC: Perceived Behavioral Control. All factor loadings exceeded the 0.40 threshold, and no cross-loading existed. These five factors explained 61.43 % of the variance. The Kaiser-Meyer-Olkin measure of sampling adequacy (0.904) exceeded 0.60 and Bartlett's test of sphericity ( $p < 0.001$ ) was significant, both meeting the standards required for factor analysis.

and the five TPB factors were examined and compared between men and women, using chi-square tests. Third, bivariate chi-square analyses were performed to examine the five TPB factors in relation to high versus low CSI intention, separately by gender. Finally, two parallel sets of multivariate logistic regression analyses were conducted to estimate the odds of having high CSI intention. The first set used the five TPB factors and the second set used individual TPB items as explanatory variables. Both sets were adjusted for the same control variables noted previously and were analyzed separately by gender.

**Results**

**Table 2** presents the descriptive statistics of participants' background characteristics, separately for men and women. There were slightly more seniors (27.7 %) than freshmen (25.9 %), sophomores (25.1 %), and juniors (21.3 %). The majority lived in dormitories (40.7 %), while others lived at home (33.0 %) or in rented housing (26.3 %). More than half of the participants reported being single (57.8 %) and having had no sexual experience (56.6 %). Additionally, 28.9 % reported having had one sex partner, while 10.8 % reported having had two or more partners in the past year.

As shown in **Table 3**, over half of men (53.6 %) exhibited high CSI intention, compared with 31.7 % of women ( $p < 0.001$ ). Across the five TPB factors concerning CSI, significant gender differences emerged in all chi-square comparisons ( $p < 0.001$ ), with men showing more positive attitudes and perceiving more supportive norms and higher control than women. For example, a greater proportion of men held positive attitudes toward the positive outcomes of CSI (43.5 %), compared with women (14.7 %).

**Table 4** presents the bivariate analysis of the five TPB factors in relation to CSI intention, separately by gender. All chi-square comparisons were significant ( $p < 0.001$ ). As postulated by TPB, more positive

**Table 2**  
Distributions and comparisons of background characteristics among college varsity athletes in Taiwan, by gender.

Variable	Total (N = 1348) n (Col %)	Men (N = 906) n (Col %)	Women (N = 442) n (Col %)	$\chi^2$ (df)	p
<b>Background characteristics</b>					
Year in college				20.4 (3)	< 0.001
1st	349 (25.9)	224 (24.7)	125 (28.3)		
2nd	339 (25.1)	202 (22.3)	137 (31.0)		
3rd	287 (21.3)	203 (22.4)	84 (19.0)		
4th	373 (27.7)	277 (30.6)	96 (21.7)		
Living status				1.8 (2)	0.415
Home	445 (33.0)	307 (33.9)	138 (31.2)		
Dormitory	549 (40.7)	358 (39.5)	191 (43.2)		
Rented housing	354 (26.3)	241 (26.6)	113 (25.6)		
Religion				3.4 (2)	0.179
None	773 (57.3)	535 (59.1)	238 (53.8)		
Buddhist/Taoist	423 (31.4)	271 (29.9)	152 (34.4)		
Christian	152 (11.3)	100 (11.0)	52 (11.8)		
Relationship status				0.8 (1)	0.374
Single	779 (57.8)	516 (57.0)	263 (59.5)		
In a relationship	569 (42.2)	390 (43.0)	179 (40.5)		
Number of sex partners <sup>a</sup>				51.7 (3)	< 0.001
No sexual experience	763 (56.6)	452 (49.9)	311 (70.4)		
0	50 (3.7)	39 (4.3)	11 (2.5)		
1	389 (28.9)	297 (32.8)	92 (20.8)		
≥ 2	146 (10.8)	118 (13.0)	28 (6.3)		

Col: column.

<sup>a</sup> Number of sex partners in the past year.

**Table 3**  
Distributions and comparisons of CSI intention and five TPB factors among college varsity athletes in Taiwan, by gender.

Variable	Total (N = 1348) n (Col %)	Men (N = 906) n (Col %)	Women (N = 442) n (Col %)	$\chi^2$ (df)	p
CSI intention <sup>a</sup>				57.6 (1)	< 0.001
Low	722 (53.6)	420 (46.4)	302 (68.3)		
High	626 (46.4)	486 (53.6)	140 (31.7)		
<b>Five TPB factors</b>					
ATB about positive outcomes				125.5 (2)	< 0.001
Negative	448 (33.2)	230 (25.4)	218 (49.3)		
Neutral	440 (32.6)	282 (31.1)	158 (35.7)		
Positive	459 (34.1)	394 (43.5)	65 (14.7)		
ATB about negative outcomes				34.8 (2)	< 0.001
Negative	452 (33.5)	259 (28.6)	193 (43.6)		
Neutral	456 (33.8)	315 (34.8)	141 (31.9)		
Positive	438 (32.5)	331 (36.5)	107 (24.2)		
Subjective norm				59.9 (2)	< 0.001
Unsupportive	449 (33.3)	249 (27.5)	200 (45.2)		
Neutral	421 (31.2)	276 (30.5)	145 (32.8)		
Supportive	466 (34.6)	370 (40.8)	96 (21.7)		
PBC under facilitating conditions				24.7 (2)	< 0.001
Low	552 (40.9)	330 (36.4)	222 (50.2)		
Intermediate	337 (25.0)	237 (26.2)	100 (22.6)		
High	426 (31.6)	316 (34.9)	110 (24.9)		
PBC under constraining conditions				35.2 (2)	< 0.001
Low	447 (33.2)	312 (34.4)	135 (30.5)		
Intermediate	439 (32.6)	249 (27.5)	190 (43.0)		
High	429 (31.8)	322 (35.5)	107 (24.2)		

CSI: condomless sexual intercourse; TPB: Theory of Planned Behavior; ATB: Attitude Toward the Behavior; PBC: Perceived Behavioral Control; Col: column. As detailed in the Methods section, the TPB factors were trichotomized using tertiles as cutoffs, and the response categories were relative (e.g., relatively positive, relatively neutral, relatively negative).

<sup>a</sup> Dichotomized using the median as the cutoff.

attitudes, more supportive norms, and higher perceived control (under constraining conditions) were positively related to high CSI intention. For example, among men, as their attitudes toward the positive outcomes of CSI shifted from negative to neutral and then to positive, the proportion of those with high CSI intention changed from 31.7 % to 53.9 % and 66.2 %, respectively; a similar pattern was observed among women. However, for perceived control (under facilitating conditions), a U-shaped pattern was noted such that men and women with intermediate control had the highest proportion of having high CSI intention (63.3 % and 46.0 %, respectively).

**Table 5** presents two multivariate logistic regression models evaluating the associations between the five TPB factors and high CSI

**Table 4**

Bivariate analysis of five TPB factors in relation to high versus low CSI intention among college varsity athletes in Taiwan, by gender.

Variable	Men (N = 906)		X <sup>2</sup> (df)	p	Women (N = 442)		X <sup>2</sup> (df)	p
	High intention n (Row %)	Low intention n (Row %)			High intention n (Row %)	Low intention n (Row %)		
<b>Five TPB factors</b>								
ATB about positive outcomes			69.5 (2)	< 0.001			42.6 (2)	< 0.001
Negative	73 (31.7)	157 (68.3)			38 (17.4)	180 (82.6)		
Neutral	152 (53.9)	130 (46.1)			68 (43.0)	90 (57.0)		
Positive	261 (66.2)	133 (33.8)			34 (52.3)	31 (47.7)		
ATB about negative outcomes			37.6 (2)	< 0.001			14.2 (2)	< 0.001
Negative	99 (38.2)	160 (61.8)			43 (22.3)	150 (77.7)		
Neutral	177 (56.2)	138 (43.8)			56 (39.7)	85 (60.3)		
Positive	209 (63.1)	122 (36.9)			41 (38.3)	66 (61.7)		
Subjective norm			51.9 (2)	< 0.001			28.3 (2)	< 0.001
Unsupportive	101 (40.6)	148 (59.4)			45 (22.5)	155 (77.5)		
Neutral	130 (47.1)	146 (52.9)			44 (30.3)	101 (69.7)		
Supportive	251 (67.8)	119 (32.2)			51 (53.1)	45 (46.9)		
PBC under facilitating conditions			38.9 (2)	< 0.001			18.7 (2)	< 0.001
Low	133 (40.3)	197 (59.7)			51 (23.0)	171 (77.0)		
Intermediate	150 (63.3)	87 (36.7)			46 (46.0)	54 (54.0)		
High	192 (60.8)	124 (39.2)			41 (37.3)	69 (62.7)		
PBC under constraining conditions			54.6 (2)	< 0.001			18.6 (2)	< 0.001
Low	128 (41.0)	184 (59.0)			28 (20.7)	107 (79.3)		
Intermediate	123 (49.4)	126 (50.6)			60 (31.6)	130 (68.4)		
High	224 (69.6)	98 (30.4)			50 (46.7)	57 (53.3)		

CSI: condomless sexual intercourse; TPB: Theory of Planned Behavior; ATB: Attitude Toward the Behavior; PBC: Perceived Behavioral Control.

As detailed in the Methods section, the TPB factors were trichotomized using tertiles as cutoffs, and the response categories were relative (e.g., relatively positive, relatively neutral, relatively negative).

**Table 5**

Multivariate logistic regression analysis estimating the odds of having high CSI intention among college varsity athletes in Taiwan, by gender: using five TPB factors as explanatory variables.

Variable	Men AOR (95 % CI)	Women AOR (95 % CI)
<b>Five TPB factors</b>		
ATB about positive outcomes (Ref: negative)		
Neutral	2.51 (1.60–3.92)***	3.79 (1.96–7.33)***
Positive	4.09 (2.59–6.45)***	5.71 (2.51–12.96)***
ATB about negative outcomes (Ref: negative)		
Neutral	1.71 (1.13–2.57)**	2.67 (1.38–5.15)**
Positive	3.03 (1.89–4.85)***	2.92 (1.35–6.35)**
Subjective norm (Ref: unsupportive)		
Neutral	1.34 (0.87–2.06)	0.91 (0.48–1.73)
Supportive	1.95 (1.26–3.03)**	1.74 (0.85–3.54)
PBC under facilitating conditions (Ref: low)		
Intermediate	1.93 (1.28–2.91)**	1.30 (0.67–2.54)
High	1.31 (0.87–1.95)	0.90 (0.45–1.80)
PBC under constraining conditions (Ref: low)		
Intermediate	1.45 (0.93–2.28)	2.46 (1.19–5.05)*
High	2.00 (1.31–3.05)***	3.45 (1.55–7.70)**
Omnibus Test of Model	X <sup>2</sup> (df) = 268.0 (21), p < 0.001	X <sup>2</sup> (df) = 166.5 (21), p < 0.001
Hosmer-Lemeshow Test	X <sup>2</sup> (df) = 7.4 (8), p = 0.499	X <sup>2</sup> (df) = 4.3 (8), p = 0.830
Percentage Correct	73.0 %	81.3 %

CSI: condomless sexual intercourse; TPB: Theory of Planned Behavior; ATB: Attitude Toward the Behavior; PBC: Perceived Behavioral Control; AOR: adjusted odds ratio; CI: confidence interval.

As detailed in the Methods section, the TPB factors were trichotomized using tertiles as cutoffs, and the response categories were relative (e.g., relatively positive and relatively neutral, with relatively negative as reference). Both models were adjusted for the control variables noted in the Methods section.

\*p < 0.05; \*\*p ≤ 0.01; \*\*\*p ≤ 0.001.

intention, separately for men and women. Both models were adjusted for the same set of control variables noted in the Measures section. This study found that men with neutral (AOR = 2.51, 95 % CI 1.60–3.92) and positive (AOR = 4.09, 95 % CI 2.59–6.45) attitudes toward the positive outcomes of CSI were more likely to report having high CSI intention, compared with their counterparts with negative attitudes. Women with neutral (AOR = 3.79, 95 % CI 1.96–7.33) and positive (AOR = 5.71, 95 % CI 2.51–12.96) attitudes toward the positive outcomes of CSI also had greater odds of reporting high CSI intention. Similarly, neutral and positive attitudes toward the negative outcomes of CSI were significantly related to high CSI intention for both men and women. Further, supportive norms (AOR = 1.95, 95 % CI 1.26–3.03) and intermediate control under facilitating conditions (AOR = 1.93, 95 % CI 1.28–2.91) were significantly related to high CSI intention only among men. Lastly, under constraining conditions, high control among men, and intermediate and high control among women, were significantly related to high CSI intention.

Table 6 presents two multivariate logistic regression models showing the individual TPB items that were significantly associated with high CSI intention, separately by gender. Both models were adjusted for the same set of control variables noted in the Measures section. The significant individual TPB items exhibited different patterns between men and women. First, regarding attitudes toward the positive outcomes of CSI, two items were significant: CSI enhancing psychological pleasure (AOR = 2.18, 95 % CI 1.47–3.22) for men, and CSI making them feel trusted by their sex partner (AOR = 3.43, 95 % CI 1.74–6.76) for women. Next, regarding attitudes toward the negative outcomes of CSI, four TPB items for men and only one item for women were significant. Among men, relatively positive attitudes toward CSI resulting in STIs, unintended pregnancy, and violation of their personal values were linked to high CSI intention. Notably, positive attitudes toward CSI making them feel guilty were associated with lower CSI intention among men (AOR = 0.60, 95 % CI 0.40–0.92), but elevated CSI intention among women (AOR = 1.96, 95 % CI 1.04–3.68).

Table 6 also shows that, concerning subjective norms, perceiving high support for CSI from two types of salient persons was significantly associated with high CSI intention: significant others for women (AOR = 4.33, 95 % CI 1.51–12.41), and close friends for both men (AOR = 2.18,

**Table 6**

Multivariate logistic regression analysis estimating the odds of having high CSI intention among college varsity athletes in Taiwan, by gender: using individual TPB items as explanatory variables.

Variable	Men AOR (95 % CI)	Women AOR (95 % CI)
<b>ATB about positive outcomes</b> (Ref: negative)		
CSI can enhance psychological pleasure		
Positive	2.18 (1.47–3.22)***	–
CSI can make me feel trusted by my sex partner		
Positive	–	3.43 (1.74–6.76)***
<b>ATB about negative outcomes</b> (Ref: negative)		
CSI will result in sexually transmitted infections		
Positive	1.88 (1.23–2.87)**	–
CSI will result in unintended pregnancy		
Positive	2.15 (1.41–3.27)***	–
CSI will make me feel guilty		
Positive	0.60 (0.40–0.92)*	1.96 (1.04–3.68)*
CSI violates my personal values		
Positive	1.88 (1.25–2.81)**	–
<b>Subjective norm</b> (Ref: unsupportive)		
I think my significant other would support me engaging in CSI		
Supportive	–	4.33 (1.51–12.41)**
I think my close friends would support me engaging in CSI		
Supportive	2.18 (1.50–3.15)***	2.72 (1.38–5.36)**
<b>PBC under facilitating conditions</b> (Ref: low)		
I am allergic to latex condoms		
High	1.45 (1.01–2.09)*	–
I am not able to get condoms that fit		
High	–	4.10 (2.15–7.80)***
<b>PBC under constraining conditions</b> (Ref: low)		
I have condoms close at hand when needed		
High	1.97 (1.35–2.88)***	–
Omnibus Test of Model Coefficients	$\chi^2$ (df) = 263.5 (19), $p < 0.001$	$\chi^2$ (df) = 153.6 (16), $p < 0.001$
Hosmer-Lemeshow Test	$\chi^2$ (df) = 9.3 (8), $p = 0.315$	$\chi^2$ (df) = 0.96 (8), $p = 0.99$
Percentage Correct	73.2 %	81.6 %

CSI: condomless sexual intercourse; TPB: Theory of Planned Behavior; ATB: Attitude Toward the Behavior; PBC: Perceived Behavioral Control; AOR: adjusted odds ratio; CI: confidence interval.

As detailed in the Methods section, the individual TPB items were dichotomized using the median as the cutoff, and the response categories were relative (e.g., relatively positive, with relatively negative as reference). Both models were adjusted for the control variables noted in the Methods section. Both models were estimated using stepwise selection procedures, retaining only statistically significant variables ( $p < 0.05$ ). As a result, there are no non-significant AORs in the final models. Variables not included in a model are marked with a symbol “–” in the table.

\* $p < 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .

95 % CI 1.50–3.15) and women (AOR = 2.72, 95 % CI 1.38–5.36). As regards perceived control under facilitating conditions, two items were significant: being allergic to latex condoms (AOR = 1.45, 95 % CI 1.01–2.09) for men, and not being able to get condoms that fit (AOR = 4.10, 95 % CI 2.15–7.80) for women. Lastly, perceiving high control under constraining conditions, such as having condoms close at hand when needed (AOR = 1.97, 95 % CI 1.35–2.88), was significantly associated with high CSI intention among men.

**Discussion**

This study addresses an existing gap in the literature by exploring CSI rather than condom use intention among college athletes. Notably, this theory-driven investigation may be the first to apply the TPB framework expansively in examining CSI intention and gender differences within a large sample of exclusively cisgender heterosexual college athletes. In alignment with the TPB tenets, we identified five distinct TPB factors corresponding to the constructs of attitudes, norms, and perceived control, all significantly associated with CSI intention. Furthermore, we observed gender differences in CSI intention and distributions of TPB factors through bivariate analysis. Finally, our multivariate analysis, stratified by gender, revealed differential associations of various TPB factors and specific individual TPB items with high CSI intention among men and women. Thus, illuminating these differential relationships by gender, as discussed below, can provide critical insights for future research and the development of gender-specific interventions to mitigate sexual risk behaviors in this young population.

*Attitudes toward positive outcomes of CSI most strongly associated with CSI intention*

Consistent with previous TPB-based studies among South African university students (Protogerou et al., 2013) and Canadian adolescents (Craig et al., 2000), which found that positive attitudes were the strongest covariate of condom use intention, our study further revealed that not only positive attitudes but, specifically, attitudes toward the positive outcomes of CSI were most strongly associated with CSI intention among Taiwanese college athletes. By differentiating between positive and negative outcomes of CSI, our innovative approach refines the TPB framework, enabling more nuanced comparisons. This novel finding also underscores the importance of focusing on positive CSI outcome expectations that are salient to college athletes, allowing future interventions to effectively target these specific beliefs and address sexual risk-taking behaviors.

While our study reveals that attitudes toward the positive outcomes of CSI are the most potent driver of CSI intention among Taiwanese college athletes—consistent with the above-mentioned findings from South African and Canadian youths regarding condom use intention—this result must be interpreted within the sociocultural context of Taiwan. Taiwan’s societal norms are deeply rooted in Confucian values, which emphasize chastity and premarital virginity (Gao et al., 2012), possibly leading to more conservative attitudes toward sexual behavior, compared with those in South Africa and Canada. Despite these cultural differences, the strong association between positive attitudes and CSI or condom use intention across these diverse settings suggests a universal applicability of the TPB framework. However, the Confucian influence in Taiwan may have a moderating effect, necessitating culturally tailored sexual health interventions that respect and address these traditional values while promoting safer sex practices among youths. This highlights the need for further research to explore how traditional cultural values intersect with modern sexual behaviors in different societies.

*Men motivated by psychological pleasure*

In addition to the overall attitudes toward the positive outcomes of CSI, this study also undertook TPB item analysis to identify gender-specific attitudes toward CSI. Among these cisgender heterosexual college athletes, men who highly valued psychological pleasure from CSI exhibited greater CSI intention. Importantly, this finding parallels a seminal TPB-based study on condomless anal intercourse intention among young men who have sex with men, where anally insertive partners (i.e., tops) with positive attitudes toward increased psychological pleasure demonstrated an almost 20-fold increase in intention (Chu & Huang, 2018). Although examining different populations and

behaviors, both studies highlight psychological pleasure as a key motivator for men regarding condomless and penetrative sexual behaviors. Thus, our finding broadens the knowledge base and expands TPB's applicability in sex research literature.

*Trust by sex partners: "double jeopardy" for women in both "gain and loss frames"*

In contrast to men, women with favorable views on feeling trusted by their sex partner through CSI showed heightened CSI intention. Notably, trust has also been highlighted in previous research among adolescents as a barrier to condom use, as using condoms can imply a lack of trust and suspicion of STIs (Zwane et al., 2004). In the context of CSI, we identified a "double jeopardy" situation, where women faced dual risks in both the "gain and loss frames". For instance, in the gain frame, women may perceive that engaging in CSI could lead to gaining their partner's trust. In the loss frame, women may perceive that not engaging in CSI could lead to losing that trust. Thus, this creates the aforementioned dual-risk situation, where women are at risk in both frames: namely, they might engage in CSI to either gain or avoid losing that trust, ultimately exposing themselves to CSI-associated risks, even if they feel these risks are offset by the trust they gain or maintain through CSI. Consequently, as evidenced in our study, women who highly value the feeling of being trusted by their sex partner may be particularly prone to have elevated CSI intention.

*Attitudes toward negative outcomes of CSI differentially associated with CSI intention by gender*

The strengths and patterns of associations between the overall attitudes toward the negative outcomes of CSI and CSI intention differed by gender. Specifically, men's odds of having high CSI intention were positively associated with incrementally more favorable attitudinal evaluations, indicating an upward slope of association. By contrast, women with relatively neutral and relatively positive attitudes both showed consistent but similarly elevated odds of high CSI intention, suggesting a plateau beyond neutral attitudes. Notably, this study may be the first to report these gender-specific differential patterns and significant relationships between the overall attitudes toward the negative outcomes of CSI and CSI intention within the TPB framework. It is concerning that relatively positive and even relatively neutral attitudes (i.e., being less concerned or more dismissive) toward the negative outcomes of CSI were associated with heightened CSI intention. This novel and critical finding provides insights into motivational factors for sexual risk-taking and highlights the need to explore other CSI-related negative outcomes that might impact young people's attitudes and CSI intention.

*STIs, unintended pregnancy, and violating personal values: significant only among men*

In the parallel set of analysis using individual TPB items, three attitudinal items concerning the negative outcomes of CSI were found significant, but only among men: STIs, unintended pregnancy, and violating personal values. Unlike the findings from Protogerou et al. (2013), which demonstrated that concerns about STIs and unintended pregnancies were associated with increased condom use intention among both college men and women, our study examined a contrasting shift toward greater sexual risk-taking behaviors. Specifically, while concerns about these negative outcomes were similar, our findings revealed that men who were less concerned about and more dismissive of these issues exhibited higher CSI intention.

Considering the cross-sectional nature of this study, a plausible reverse explanation for the association suggests that men with high CSI intention may possess inherent sensation-seeking tendencies and tend to underestimate the risks of adverse outcomes occurring, hence leading to

less negative attitudinal evaluations of STIs and unintended pregnancy. Consequently, we observed relatively positive attitudes correlated with high CSI intention. These findings underscore an urgent need for targeted health education. By focusing on the perceived risks and consequences of CSI, especially among men, we can address the disconnect between their risk perception and behavioral intention. Notably, attitudes toward these two specific negative outcomes were not significant among women, highlighting the differential concerns and evaluations by gender, and pointing to the necessity of gender-sensitive approaches in designing interventions.

Furthermore, men who were less concerned about CSI violating their personal values showed higher CSI intention. Invoking the same reverse explanation noted above, it is plausible that men with elevated CSI intention might be more willing to compromise their personal values regarding CSI, thus feeling relatively less negative about such a violation. It is noteworthy that this values-based attitudinal item was significantly related to CSI intention only among men, underscoring another crucial gender difference that has not been documented in prior literature. Hence, future research should further explore specific personal values that might differentially affect CSI intention among young men and women.

*A possible subjective norm threshold for elevated CSI intention only among men*

As noted previously, TPB-guided research among Canadian adolescents (Craig et al., 2000) and Korean college students (Cha et al., 2008) reported gender differences in the relationships between subjective norms and condom use intention. Interestingly, our study of CSI intention also found subjective norms to be significant, but only men perceiving high support for their CSI exhibited heightened CSI intention. Furthermore, this relationship was not significant among men perceiving neutral norms, suggesting the existence of a subjective norm threshold for elevated CSI intention among men. Such a threshold is understandable, given the considerable CSI-related health risks, along with potential social criticisms and pressures surrounding CSI. Therefore, only men perceiving high support beyond the threshold showed elevated CSI intention.

Another noteworthy point is that while the overall subjective norms were significantly associated with CSI intention in bivariate analysis for both genders, this factor no longer remained significant among women in the multivariate models after adjustment for attitudes and perceived control, which suggests that subjective norms are a relatively less important and insufficient driver for CSI among women, compared with other TPB factors. A possible explanation for this gender difference in normative influence is that Taiwanese society has been deeply influenced by traditional Confucian culture, which places a strong emphasis on the virtue of chastity and premarital virginity for women (Gao et al., 2012). By contrast, the social atmosphere and norms are generally more permissive and tolerant toward men concerning sex-related issues. This phenomenon is evidenced by our finding that a greater proportion of men (40.8%) than women (21.7%) perceived overall supportive norms for CSI, signifying a relatively more lenient and accepting social culture toward men's sexual behavior.

Further, prior research on youth sexual development has shown that, during the process of becoming a sexual being, sociocultural context plays a critical role in shaping young people's sexual perceptions as they seek clues about what constitutes acceptable sexual behaviors (Shoveller et al., 2004). Given the aforementioned more permissive gendered norms toward men, they may gather social clues and perceive CSI as somewhat implicitly condoned by society for men, thereby resulting in a significant linkage between perceived overall supportive norms and high CSI intention only among men.



### *Different salient persons by gender: close friends for both and “partner-centered” for women*

In addition to the overall subjective norms, a more nuanced analysis of individual TPB items and specific salient persons revealed that supportive norms from close friends were significantly associated with high CSI intention for both genders. This finding underscores the importance of peer norms in this young athlete population and echoes previous studies among college athletes, which found that perceived approval from their teammates regarding alcohol and drug use behaviors impacted their own behaviors (Olthuis et al., 2011; Seitz et al., 2014). Considering the personal and private nature of sexual behavior, it is understandable why close friends emerged as a significant source of normative influence in this CSI study. Prior research among Taiwanese college students also found that their perceptions about their best friends' premarital sexual behavior were associated with their own engagement in premarital sex (Chiao & Yi, 2011). Thus, our study not only reinforces the critical role of close friends within this college population but also extends the current literature by identifying a specific form of sexual behavior, CSI, where their perceived support from close friends may influence the likelihood of their engagement in CSI.

Beyond close friends, our analysis also uncovered that women perceiving supportive norms from their significant other exhibited greater CSI intention. This result resonates with an above-noted finding about trust by sex partners, suggesting that women may be more “partner-centered” than men concerning CSI. Hence, they may have elevated CSI intention when feeling expected or encouraged by their significant other to engage in CSI. Therefore, greater emphasis should be placed on the role and influence of their sex partners to enhance the effectiveness of sexual health promotion efforts.

### *Perceived control and gender-specific CSI-facilitating conditions: latex allergies versus condom fit*

Surprisingly, the overall perceived control under CSI-facilitating conditions was significant only among men perceiving intermediate control. This TPB factor was not significant among women, suggesting that their CSI was driven less by facilitating, situational factors—which are external, often variable, and context-dependent—and more by intrapersonal factors, such as attitudinal evaluations concerning CSI. These factors, discussed earlier, are internal, foundational, and relatively stable across different contexts. Interpersonal factors, such as supportive norms from significant others and close friends, also played a significant role in women's CSI intention.

While this overall perceived control TPB factor was significantly linked to elevated CSI intention only among men in our athlete sample, a prior study might shed light on this relationship. Specifically, previous research has reported that risk behaviors, particularly among college athletes, are strongly driven by sensation-seeking and risk-taking tendencies (Mastroleo et al., 2013). Consequently, if these men perceive high control over CSI, they might find it less appealing to engage in CSI for thrill-seeking, which could explain the lack of heightened CSI intention observed in this college athlete sample. Alternatively, a plausible reverse explanation is that men contemplating CSI might be more mindful of potential challenges and, therefore, more conservative in their assessment of control over CSI engagement, leading to only intermediate perceived control.

Our TPB item analysis further identified two gender-specific CSI-facilitating conditions, indicating situations that are conducive to CSI engagement. Among men, perceiving high control over CSI under such facilitating conditions as being allergic to latex condoms was significantly associated with elevated CSI intention. This condition seemingly makes engagement in CSI “justifiable” among these men. However, it is worth noting that this TPB item evaluates participants' perceived control over CSI under hypothetical circumstances, rather than them being allergic to latex condoms in reality. Nonetheless, it identifies a gender-

specific condition that may be deemed a “legitimate” reason to engage in CSI for men. Surprisingly, the inability to obtain condoms with a proper fit was a significant CSI-facilitating condition for women, suggesting that condom-related sensations during sex might influence their CSI intention. Taken together, these findings pinpoint gender-specific conditions that are pertinent to CSI intention among these college athletes and can inform targeted health education strategies to address their needs under these specific CSI-facilitating conditions for optimal program effectiveness.

### *Perceived control under CSI-constraining conditions: differential patterns by gender*

Our study also investigated CSI-constraining conditions that would typically increase the difficulty of engaging in CSI. Surprisingly, higher overall perceived control under these conditions still played a significant role in elevated CSI intention for both genders. This suggests that individuals who feel in control of CSI despite obstacles likely possess strong determination to engage in CSI, signifying their resilience and intentionality in pursuing this behavior. Specifically, among men, only high overall perceived control was significant, suggesting a higher threshold required for engagement in CSI for men. By contrast, women with intermediate and high overall perceived control both exhibited heightened CSI intention. Collectively, these findings suggest that women might have “the upper hand” in negotiating and decision-making within the context of intentional CSI as a deliberate and planned behavior. As such, even with only intermediate overall perceived control under constraining conditions, women showed elevated CSI intention. These gender-specific patterns highlight delicate gender dynamics in the realm of sexual behavior and warrant more research attention.

Further analysis of individual TPB items revealed that, among men, perceiving high control over CSI under constraining conditions, such as having condoms close at hand when needed, was significantly associated with heightened CSI intention. This finding is particularly concerning because it underscores a high level of determination to engage in CSI despite the presence of condoms. It essentially emphasizes that, even when condoms are readily accessible, individuals with high CSI intention may still actively seek out CSI, reflecting a core aspect of intentional CSI. Therefore, this specific TPB item could serve as a valuable indicator for identifying college athletes, and broadly college students, with greater sexual risks in future research and sexual health promotion campaigns.

### *Limitations, strengths, and future research directions*

This study has several limitations that could be addressed in future research. First, the cross-sectional nature of the data limits our capacity to confirm the causality of the significant associations identified in this study. Second, because the majority of this young population had not had sexual experience, this study focused on their CSI intention rather than actual behavior. Third, while this study accounted for participants' relationship status in the analysis when examining CSI intention, it did not measure their use of or intention to use other contraceptive methods within the relationship, which could also influence their CSI intention. Fourth, the participants analyzed in this study were exclusively cis-gender heterosexual college athletes.

Despite these limitations, this study has several pertinent strengths, as well as future research directions, that should be noted. First, although this study is cross-sectional, with all variables measured concurrently—thus allowing for possible reverse explanations as previously discussed—the associations observed are implicitly prospective in nature. This is due to the embedded temporal sequence between the explanatory TPB variables (present-focused, self-reported beliefs at the present moment of the survey) and the outcome measure of CSI intention (future-oriented, self-estimated likelihood of CSI engagement

within the next year). Therefore, the phrasing of these measures, along with the explicitly specified time frame, supports the prospective interpretation of the significant associations observed in this study.

Second, it is also noteworthy that the complete anonymity afforded by our study design was instrumental in eliciting candid responses to sensitive questions concerning CSI, enhancing the validity and reliability of data. Third, investigating CSI intention has unique advantages and importance, as noted previously. From a prevention perspective, recognizing CSI intention as the antecedent of the actual CSI behavior allows us to develop preventive interventions to mitigate this risk behavior before it occurs. Finally, by leveraging the psychometrically validated measures employed in this study, future investigations could extend these inquiries to the broader college student population for comparative analyses.

Future research should also examine participants' use of contraceptive methods other than condoms and their exclusively monogamous relationship status when evaluating their CSI behavior or intention. Longitudinal research could also help to validate the psychosocial determinants of actual CSI behavior, if and when it occurs. In addition, building upon our new empirical evidence of the applicability of TPB to the study of CSI intention among heterosexual college athletes, future research could purposefully include a larger sample of sexual and gender minority individuals to further explore potential differences by sexual orientation and gender identity.

#### *Implications for sexual health promotion in the college athlete population*

In light of the literature reviewed earlier, which suggests that college athletes may face greater sexual risks than non-athlete peers, this study set out to investigate their CSI intention and gender differences, with the goal of providing empirical support and insights into effective strategies for health and sexuality education specifically for this population. In terms of channels for interventions specifically for these athletes, we could leverage certain features that differentiate them from general college students, such as their routine team practices and varsity team social network, which consists mainly of teammates and coaches. These distinct features provide additional opportunities to reach them.

For instance, it is natural to think of teammates as potential salient persons who might impact these college athletes' subjective norms and consequently their engagement in CSI. Varsity teammates are already de facto schoolmates/classmates, and given the common experiences and unique camaraderie and solidarity that they share within the same team, teammates are likely also their close friends. Since these two roles have both been included in this study, we did not additionally measure teammates separately for assessment. While close friends emerged as significant salient persons for CSI among both genders in this study and may serve as a proxy for teammates, they are not a direct measure of teammates. Hence, it remains unclear whether perceived supportive norms from teammates would be independently associated with CSI intention among college athletes, above and beyond the normative influence of close friends. Further, conversations about CSI are likely to occur only among selective salient persons. Even though teammates are considered to be within a close circle of friends, whether they are considered "close" enough friends for this matter has yet to be confirmed with further research. While it is inconclusive concerning whether teammates could be enlisted to create social norms for effective CSI prevention programs, it could be a promising and interesting avenue for future research.

On the other hand, according to our analysis results, coaches do not seem to play an influential role in this particular behavior among college athletes. Several factors could contribute to coaches having limited influence. First, coaches primarily focus on athletic performance, training, and team dynamics, and sexual behavior may fall outside their professional scope, leading to less influence in this area. Second, athletes may perceive sexual behavior as a private matter unrelated to their sports performance, and coaches might also avoid intruding into personal lives

to maintain boundaries. Third, peers often have more immediate and relatable influence among young people, and hence athletes may prioritize peer norms over coach guidance. Therefore, for coaches to take on a more active role in CSI prevention in the future, they may need to be better equipped with training on sexual health education, and the aforementioned barriers also need to be addressed.

To take advantage of the varsity team features to promote sexual health, below are some examples of the next steps that can be taken, drawing on our study results. For instance, our exploratory factor analysis differentiated attitudes toward positive versus negative outcomes of CSI, enabling more nuanced comparisons and revealing that attitudes toward positive outcomes were the strongest driver of CSI intention among both genders. Accordingly, on the basis of our further analysis indicating that men prioritized psychological pleasure and women emphasized trust by sex partners, varsity teams can create a safe space to encourage open conversations, share experiences, and challenge these existing myths around sexual behavior and misperceived norms. Our study also found that attitudes toward certain negative outcomes, such as feelings of guilt, were divergently associated with CSI intention by gender. This could be an engaging topic for an open discourse among teammates.

Furthermore, in this college athlete sample, perceived supportive norms from significant others played a significant role only among women, signifying their "partner-centered" tendency regarding CSI. By contrast, men exhibited a threshold regarding overall subjective norms. The debate about these interesting gender differences, along with the debunking of ill-perceived supportive norms from close friends, could be incorporated into the activities at a team-building retreat or camp hosted by the varsity team. By involving teammates, this health promotion effort ensures that norms are collectively shaped, reinforcing positive behaviors and challenging harmful ones. Lastly, our theory-driven analysis also identified significant TPB items related to perceived control under facilitating versus constraining conditions, such as being allergic to latex condoms and not being able to get condoms that fit. These comprehensible and relatable issues and barriers could be discussed, and pragmatic solutions might emerge, in open dialogues led by team captains or respected peers during team meetings specifically organized as part of their own university's sexual health awareness campaign.

Taken together, in view of our empirical findings, it should be noted that given these student-athletes' time allotments on campus mostly as college students, their primary role is still as students, with athletes as secondary. Accordingly, for optimal resource allocation, sexual health education and promotion efforts should primarily target them in their capacity as college students, addressing their needs and experiences as students. The goal is to be inclusive and avoid unintended stigmatizing or labeling effects. Notably, the majority of this college athlete sample had not had sexual experience, thus providing windows of opportunity to demystify or rectify their misperceptions about CSI before actual behavior occurrence. Through the lens of prevention, this reiterates the importance of understanding their CSI intention and associated factors, as in this study, instead of solely examining CSI behavior.

#### **Conclusions**

Our theory-driven exploration of CSI intention and gender differences among college athletes provides valuable insights into the intricate factors shaping sexual risk behaviors. Through an expanded TPB framework, we identified five distinct TPB factors pertaining to attitudes, norms, and perceived control. As hypothesized, more positive attitudes, more supportive norms, and higher perceived control were associated with greater CSI intention. Gender differences were evident in both the distributions of TPB factors and their associations with CSI intention. All five TPB factors were significantly associated with CSI intention among men, but only three among women. Men generally exhibited more favorable views toward CSI than women, indicating

gendered effects on sexual risk behaviors.

These gender-specific patterns underscore the complexity of gender dynamics in sexual behavior. Given the modifiable nature of TPB's psychosocial variables, actionable strategies can be developed that take into account the distinct intrapersonal, interpersonal, and situational factors identified for targeted health education. By extending the TPB framework, this study enhances our understanding of deliberate CSI intention, setting a foundation for future investigations and interventions employing precision behavioral science. Our study's insights can guide the design of effective, empirically-based programs that are gender-tailored to the unique needs of this young population.

### CRedit authorship contribution statement

**Jiun-Hau Huang:** Conceptualization, Methodology, Funding acquisition, Investigation, Project administration, Supervision, Formal analysis, Validation, Writing – original draft, Writing – review & editing. **Fang-Yu Li:** Data curation, Formal analysis, Visualization, Writing – original draft. **Chia-Hsien Hsu:** Data curation, Formal analysis, Visualization, Writing – review & editing.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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