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# Perceived social pressure and intention to play through injuries in junior ice hockey: The sporting environment matters

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## ABSTRACT

Playing when injured is a risky yet common business among ice hockey players. Conceptualized within the framework of the theory of planned behaviour, the current cross-sectional study aimed to test a multiple-mediator model linking players' perceived social pressure to their intention to play when injured. We tested whether social pressure is directly and indirectly (via attitudes, subjective norms, perceived behavioural control avoidance, and situational temptation) related to intention to play when injured. We recruited 186 junior players aged 16–20 years (mean age = 17.85; standard deviation = 1.35) from two Norwegian ice hockey leagues (under 18 and under 20 years of age). The data were analysed using a linear regression procedure and a bias-corrected bootstrapping technique to measure indirect effects. The results revealed a positive direct and indirect (via attitudes, subjective norms, and situational temptation) relationship between players' perceived social pressure and their intention to play when injured. In conclusion, players that perceived pressure to play despite being injured, who perceived positive consequences of doing so, who believed that people close or important to them approved of them doing so, and who perceived game-specific temptations, were more likely to report a stronger intent to play the game when injured.

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## KEYWORDS

Athletes; coaching; injury; pain; theory of planned behaviour; youth

## Introduction

Injuries in sports are often normalized and even celebrated as expressions of true determination and dedication (Theberge, 2008). However, the mentality that a player must accept risks and play through injury to achieve sporting goals may also have adverse effects on players' health and performance (K. J. Schneider et al., 2021; S. Schneider et al., 2019). Labelled the toughest sport on ice, hockey has the reputation of being as cold and unforgiving as the surface on which it is played. Due to environmental conditions and cultural expectations of how one should deal with pain and injuries, hockey players may be particularly prone to the social pressure to keep playing when injured (Mayer et al., 2018; Schneider et al., 2021; Yeldon & Pitter, 2017). With the increasing rate of injuries among professional ice hockey players (Nordstrøm et al., 2020), there is a growing interest in primary interventions that will reverse this trend before it finds its way into youth sporting cultures (Bjørndal et al., 2021; Nemeth et al., 2005; Nordstrøm et al., 2021). Therefore, the purpose of the current study was to investigate the possible link between social pressure from the sport environment as perceived by players and players' intention to play when injured. Towards this end, we drew upon the theory of planned behaviour (TPB; Ajzen, 1991) to determine how behavioural, normative, and control beliefs relate to young players' intention to keep playing when injured.

A growing body of literature in the context of elite youth sports has suggested that environmental conditions could facilitate young athletes' willingness to take physical risks (Mayer et al., 2018; Schnell et al., 2014). When experiencing great pressure from the sports environment to fulfil role expectations as athletes, adolescent athletes were found to be more willing to hide their pain, continue their training, and compete despite being injured or suffering from an illness (Schnell et al., 2014). In addition, Schnell et al. (2014) reported that athletes who focused on their performance and attached much importance to their respective sports environments were particularly willing to risk their health. Mayer et al. (2018) found that perceptions of social pressure were positively related with athletes' willingness to engage in their respective sports despite being injured. Athletes representing ball games and weight-dependent and aesthetic sports were more prone to compete when hurt, further indicating that it was harder for them to justify taking a break from training and competition when experiencing injuries or minor health problems (Mayer et al., 2018). These findings may be considered important as they indicate that athletes adopt similar fundamental values and structural principles within their respective sports, even if these include irrational beliefs about risking everything for sporting success.

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## Theoretical framework

Various theoretical frameworks have been proposed to deal with the psychological processes involved in health-compromising behaviours. One of the most prominent ones, TPB (Armitage & Conner, 2000), emphasizes the role of effortful thinking and premeditation and assumes that attitudes, subjective norms, and perceived behavioural control (PBC) are of central importance in predicting and explaining behavioural intention and behaviour (Ajzen, 1991). According to Ajzen and Fishbein (1980), *attitudes* refer to a function of salient behavioural beliefs, each of which represents the perceived likelihood that the performance of the behaviour will lead to a particular outcome or is associated with a specific attribute. *Subjective norms* consist of beliefs about whether significant others (in the present study, the coach, peers, and parents) think one should engage in a certain behaviour. *PBC* reflects beliefs concerning whether one has access to the necessary resources (e.g., skills, information, abilities, emotions) and opportunities to execute or avoid the target behaviour (in the present study, perceived control to avoid the targeted behaviour was used). As such, PBC sheds light on the individual's internal and external control mechanisms. According to Ajzen (1991), PBC is also compatible with Bandura's (1982) concept of perceived *self-efficacy*, which reflects self-perceptions of competence and the ability to resist situational temptation. TPB assumes that behavioural, normative, and control beliefs exert an influence on behaviour indirectly through behavioural *intentions*, which reflect careful planning and motivation for performing the behaviour in question (Ajzen, 1991).

It has been suggested that TPB's components are proximal predictors of behavioural intentions and behaviours and that other distal influences (i.e., environmental constraints) on behaviour are mediated by attitudes, subjective norms, and PBC (Conner & Sparks, 2015). In sports, athletes act within an environment constrained by social forces that may influence how athletes deal with pain and injuries (Mayer & Thiel, 2018). Environments entangled with a sport ethic that advocates

athletes to sacrifice for the game, take risks, and challenge limits, would encourage athletes to neglect severe injuries in order to keep playing the game (Hughes & Coakley, 1991). Within these surroundings, injured athletes can feel pressured to ignore the pain and play through injuries or risk being stigmatized as soft or malingerers (Malcolm & Sheard, 2002; Roderick, 2006). Experiencing subtle or even direct social pressure to push their bodies to the limit may thus increase athletes' intention to keep playing when an injury occurs. That is, according to Ajzen's TPB (Ajzen, 1991), by eliciting beliefs that playing despite injury would lead to more positive than negative consequences (i.e., behavioural beliefs) and that significant others would approve of one doing so (i.e., normative beliefs) and lastly, that doing so is within one's control (i.e., control beliefs).

In line with the preceding conceptualization, playing with an injury can be seen as a goal-directed behaviour rather than a reflexive one (Luszczynska & Schwarzer, 2015), which makes the role of intentionality highly relevant to the study of players' refraining from playing when injured. To better understand how intentions are shaped, several studies have employed TPB to predict a wide variety of behaviours in various contexts, including technology acceptance (Lee, 2009), smoking initiation (Conner & Sparks, 2015), participation in physical activity (Hagger et al., 2001), the use of dietary supplements (Barkoukis et al., 2015), and the use of illicit drugs (Lazarus et al., 2015). However, there is a dearth of studies theoretically informed by TPB that focused on the intention to play when injured.

According to Armitage and Conner (2000), TPB is superior in comparison with other health behaviour models and, as such, has been proven as the most prominent theory for understanding the phenomenon of playing through injuries. To improve our understanding of the relationship between the sports environment and players' intention to play through injuries, we set out to examine a multiple-mediator model linking perceived social pressure to intention to play when injured via a set of behavioural, normative, and control beliefs, while also including situational temptation to the conceptualization of control (see Figure 1). We aimed to investigate whether social

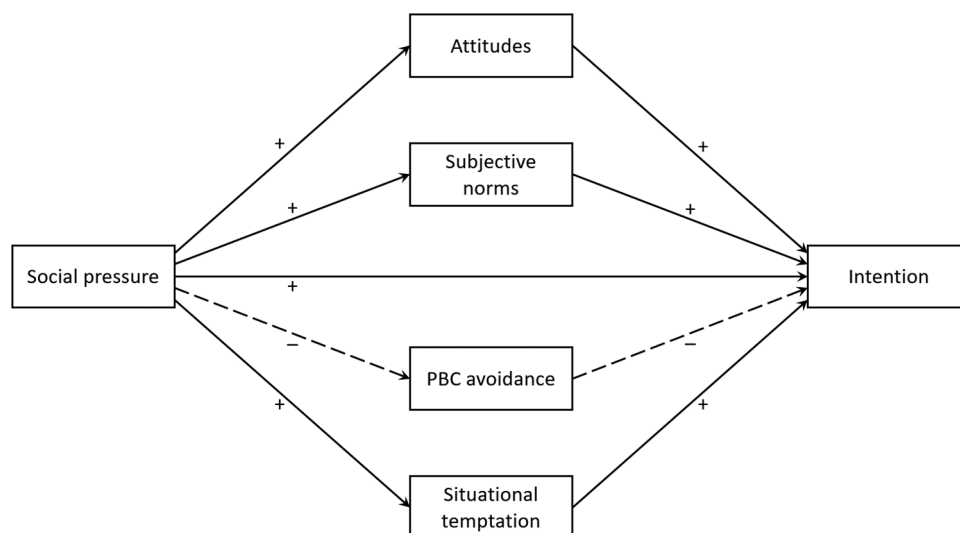


Figure 1. Proposed parallel multiple-mediator model of intention to play when injured. Note: Solid lines represent positive paths and dashed lines represent negative paths.

pressure would be directly and indirectly (via attitudes, subjective norms, PBC avoidance, and situational temptation) related to intention to play when injured. In line with evidence presenting challenges of tapping internal and external control mechanisms related to risk behaviours (Lazuras et al., 2015), the present study will make use of avoidance in the conceptualization of PBC to explicitly tap the efficacy to avoid playing despite being injured. The sport of ice hockey was chosen because hockey players may be more prone to risk their health in the service of performance than young athletes in many other sports (K. J. Schneider et al., 2021).

Based on the existing evidence, the present study tested the following hypotheses:

- (1) Perceived social pressure is directly and positively related to intention to play when injured.
- (2) Perceived social pressure is indirectly and positively related to intention to play when injured via attitudes, subjective norms, and situational temptation, while negatively related via perceived control to avoid playing when injured (i.e., PBC avoidance).

## Methods

### Participants

Using a cross-sectional survey design, a convenience sample of participants ( $N = 186$ ; 163 males, 23 females) aged 16–20 years (mean age = 17.85; standard deviation [SD] = 1.35) was recruited from 11 Norwegian junior elite clubs competing within two national ice hockey leagues (participated in by players under 18 and under 20 years of age, respectively). The participants reported having had their current coach for an average of 1.61 seasons ( $SD = 1.47$ ). Over one-third of the participants ( $N = 63$ ) reported having played for Norway's national team (under 18 or under 20 years of age), suggesting that they were regarded as being among the most talented players in their age group. The participants also experienced varied social influences from the coach, peers, parents, and others to pursue a sporting career. Most of the participants (78%) suggested that their coaches and peers had the greatest influence on them in terms of their pursuit of a sporting career. In contrast, some participants (13%) claimed that their parents had the greatest influence on them in this regard. Only a small number of participants (9%) indicated that people other than their coaches, peers, or parents had the greatest influence on them (e.g., grandparents). The male-female ratio is representative of the sport at large, at this level, in this country.

### Procedure

We recruited the study participants through a dialogue with the Norwegian Ice Hockey Association and the coaches of the respective teams. Before commencing the study, we sought ethical clearance from the University Ethics Committee of the first author's local institution. The national board of ethics and integrity in research, The Norwegian Centre for Research Data, approved the project prior to its commencement (reference number 675256). Participants read the information sheet and

were informed that participation was voluntary and that their data would be treated anonymously. The participants then provided informed consent before completing the measures described below. As the survey did not disclose sensitive or stigmatizing information, the consent required only active consent from the participants. The data were collected using the digital survey tool SurveyXact (Ramboll, 2022), which stores the data on an encrypted server. The data collection took place at the end of the competitive season 2020–21, during the winter in Norway. This meant that all the teams had played over two-thirds of the season's games; thus, some players had reached 20 years of age ( $N = 26$ ).

### Measures

All the measures were administered in the Norwegian language, following the translation-back-translation procedure from English (Harkness, 1999).

### Sociodemographic characteristics

The participants were asked to provide their personal and social characteristics (i.e., sex, age, and structure of significant others and their influence on player's sport development) and the details of their ice hockey activities (i.e., elite level, number of years with their current coach, and national team experience).

### Social pressure

We assessed the players' perceptions of the social pressure from their sport environment for them to play when injured by adopting a single-item measure from Mayer et al. (2018, p. 145): "I am competing hurt because I feel pressured by the ones from my sporting environment" (e.g., direct pressure). The responses were recorded on a 5-point scale (1 = totally disagree; 5 = totally agree), and a higher mean score indicated a higher amount of perceived social pressure to play when injured.

### Theory of Planned Behavior Scale (TPBS)

Ajzen (1991) developed TPBS to explain intentional behaviour and behaviour, which contains four components: *attitudes*, *subjective norms*, *PBC*, and *intention*. TPBS has been successfully used in previous studies (Barkoukis et al., 2015; Lazuras et al., 2015) and has demonstrated acceptable reliability, construct, and predictive validity.

Based on Ajzen's (1991, p. 193) recommendations, attitudes towards injury were measured with the stem proposition "Playing with an injury this season is ...", followed by four semantic differential evaluative adjectives (bad/good, useless/useful, harmful/beneficial, and unethical/ethical) scored on a 7-point scale. A mean score was calculated, and higher scores reflected more positive attitudes towards playing when injured. The Omega coefficient (Hayes & Coutts, 2020) for the scale in this study was .87, indicating acceptable internal reliability (DeVellis, 2017).

Subjective norms, reflecting players' normative beliefs about other people's opinions and approval of playing when injured, were assessed with four items (e.g., "Most people who are important to me would want me to play despite being injured during this season"), scored on a 7-point scale (1 = strongly disagree; 7 = strongly agree). A higher mean score denotes

others' approval of playing when injured. Additionally, due to its conceptualization regarding how one perceives people close or important to them, a higher mean score of subjective norms might also indicate subtle pressure to play when injured. Subjective norms and social pressure may indeed have an overlap in meaning, as they both encompass aspects of social influence. Nevertheless, the two constructs differ in terms of specificity. While social pressure reflects a type of social influence in more general terms, subjective norms denote a more specific form of social influence, as indicated by the terms opinions and approval of important others. The Omega coefficient for the scale in this study was .89.

PBC concerning players' control beliefs about their perceived resources and perceived control to avoid playing when injured was assessed by three items ("How much control do you have over avoid playing despite being injured this season", "How sure are you that you can avoid playing despite being injured this season", and "How difficult is it for you to avoid playing despite being injured this season"). The responses were measured on a 7-point scale anchored completely no control/complete control, completely sure I cannot/completely sure I can, and very difficult/very easy. A higher mean score indicated higher perceived control to avoid playing when injured. The Omega coefficient for the scale in this study was .74.

Intention to play when injured was assessed with three items (e.g., "I intend to play despite being injured during this season"), scored on a 7-point scale (1 = definitely not; 7 = definitely yes). The three items assessed self-predictions, which have been proven to be more relevant to adolescents than standardized intention items used mostly for adult populations (Fishbein, 2009). Framing intention items as self-predictions is also more likely to better capture the true intentionality of playing when injured among adolescents, regardless of whether or not one is injured or never experienced being so (Gibbons et al., 1998). A higher mean score denotes a stronger intention to play when injured. The Omega coefficient for the scale in this study was .96.

### *Situational temptation*

Players' ability to resist situational temptation to play despite being injured was measured using the stem proposition "How much would you be tempted to play despite being injured this season", followed by five prospective situations ("when your coach suggests so", "when you believe that most colleagues of yours play when injured", "when you were told to enhance your performance", "when you prepare for an important game", and "if you do not feel physically resilient"). The responses were recorded on a 5-point scale (1 = not at all tempted; 5 = very much tempted), and a mean score was produced, with higher scores denoting a greater temptation to play despite being injured. Conversely, a lower score would denote a higher capability to resist the temptation to play when injured. The Omega coefficient for the scale in this study was .82. This measure has been used in previous studies (Barkoukis et al., 2014; Lazuras et al., 2015) and has shown high levels of internal-consistency reliability and adequate construct validity.

### *Statistical analyses*

IBM SPSS Statistics version 28.0 was used to compute the descriptive statistics, correlations, and regression. The zero-order correlation coefficient was used to investigate the relationship between the continuous variables (Field, 2018). There were no outliers and only a few missing data, as indicated by the item-level missingness, which ranged from 0 to 4.8%. The result of Little's Missing Completely at Random Test was not significant ( $p = 0.266$ ), supporting the assumption that the missing values were missing at random. Therefore, only the values pertaining to the participants with complete data were included in the analyses. A priori sample size calculation for multiple regression (Soper, 2018) was conducted recommending a minimum of 97 participants to reach a power level of 0.8 to detect an effect size of 0.15 at an alpha level of 0.05, with six variables.

In assessing multiple mediation, a parallel multiple-mediator model was considered the appropriate statistical method (Hayes, 2017). Hayes's (2009) PROCESS macro v4.0 (model 4) for SPSS was used to test the hypothesized multiple indirect effects. This method assesses the total and direct effects ( $c$  and  $c'$ , respectively) of an independent variable on a dependent variable after controlling for the effects of multiple mediators. In addition to the normal linear regression procedures, which assume the normality of the sampling distribution, Hayes (2009) recommended a bias-corrected bootstrapping technique for measuring indirect effects. Bootstrapping generates an empirical representation of the sampling distribution (in the current study 10,000 samples were drawn) and estimates the indirect effects in each resampled dataset. Compared to other mediation methods, bootstrapping has been found to be more robust to non-normal distribution and tends to have greater power to detect significant effects while allowing for the control of covariates. To reveal the precise nature of the mediation, Hayes's (2009) technique produces point estimates and bias-corrected confidence intervals (CIs) for each of the hypothesized indirect effects and point estimates of the remaining direct effect. For the indirect-effect tests, the CIs that do not include zero between the lower and upper bounds (i.e., 95% CI) demonstrate significant mediation. In addition, the procedure produces point estimates and bias-corrected CIs for pairwise contrasts between specific indirect effects. Regarding contrasts, a percentile-based bootstrap CI that does not include zero indicates that one indirect effect is significantly stronger than another.

Because the participants in the current study were players from 11 different ice hockey clubs in Norway and included males and females, the possibility of clustering effects on team level and sex existed. Thus, to account for the possible non-independence of the team and sex variables, mediation analysis was performed with the team and sex variables included as dummy variables (i.e., 10 dummy variables for team and 1 dummy variable for sex) and treated as covariates.

### *Results*

Table 1 shows the means, SDs, and correlations of the study variables. As indicated by the mean values, the table shows that the sample of junior players reported a score below the mid-point of the scale for perceived pressure. Furthermore, the

**Table 1.** Descriptive statistics and correlations of the study variables.

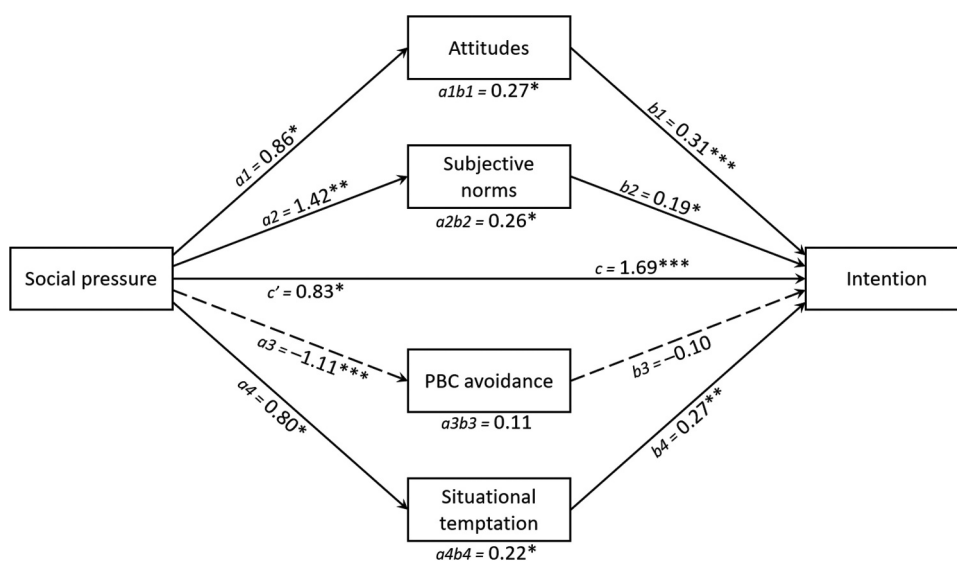
Variable	Mean (SD)	1	2	3	4	5	6	7	8
1. Social pressure	1.86 (0.99)	-							
2. Attitudes	2.51 (1.31)	0.16*	-						
3. Subjective norms	2.79 (1.45)	0.21**	0.60**	-					
4. PBC avoidance	4.69 (1.41)	-0.27**	-0.13	-0.19*	-				
5. Situational temptation	3.13 (0.88)	0.19**	0.33**	0.33**	-0.34**	-			
6. Intention	3.10 (1.82)	0.29**	0.51**	0.48**	-0.27**	0.40**	-		
7. Sex	1.12 (0.33)	0.05	0.10	0.04	-0.24**	-0.01	0.04	-	
8. Age	17.85 (1.35)	0.12	0.09	-0.01	-0.07	0.01	0.10	0.26**	-

Note: Bootstrapped descriptive statistics and zero-order correlation coefficients. Due to missing data, the overall n of the sample was 177. The possible range of responses is 1–7 for all variables except for social pressure and situational temptation (1–5, respectively). Sex was coded as 1 = males, 2 = females. \* $p < 0.05$ , \*\* $p < 0.01$  (two-tailed).

players’ scores for attitudes, subjective norms, and intention were also below the respective scales’ midpoints, whereas the scores for PBC avoidance and situational temptation were above the midpoint. Zero-order correlations showed that social pressure, attitudes, subjective norms, and situational temptation were positively correlated with intention to play when injured, while perceived control to avoid playing when injured (i.e., PBC avoidance) was negatively correlated. Furthermore, the relatively low correlation between social pressure and subjective norms ( $r = 0.21$ ,  $p < 0.01$ ) indicate that the two constructs exhibit notable differences.

Overall, the full multiple-mediator model explained 41% of the total variance in intention (adjusted  $R^2 = 0.41$ ;  $F(16, 160) = 7.03$ ;  $p < 0.001$ ). As can be seen in Figure 2, perceived social pressure predicted intention to play when injured (i.e., total effect; unstandardized beta ( $b$ ) = 1.69, 95% CI<sub>c</sub> [0.84, 2.55],  $p < 0.001$ ). Moreover, a higher level of perceived social pressure was associated with higher levels of attitudes ( $b = 0.86$ , 95% CI<sub>a1</sub> [0.03, 1.70],  $p < 0.05$ ), subjective norms ( $b = 1.42$ , 95% CI<sub>a2</sub> [0.51, 2.33],  $p < 0.01$ ), and situational temptation ( $b = 0.80$ , 95% CI<sub>a4</sub> [0.14, 1.46],  $p < 0.05$ ). Conversely, concerning players’ PBC avoidance, a higher level of perceived social pressure was related with lower levels of perceived control to avoid playing

when injured ( $b = -1.11$ , 95% CI<sub>a3</sub> [-1.74, -0.48],  $p < 0.001$ ). Furthermore, when all the mediators were entered into the equation, attitudes ( $b = 0.31$ , 95% CI<sub>b1</sub> [0.15, 0.48],  $p < 0.001$ ), subjective norms ( $b = 0.19$ , 95% CI<sub>b2</sub> [0.04, 0.34],  $p < 0.05$ ), and situational temptation ( $b = 0.27$ , 95% CI<sub>b4</sub> [0.09, 0.45],  $p < 0.01$ ) stood out as independent predictors of intention, above and beyond perceived pressure, leaving PBC avoidance ( $b = -0.10$ , 95% CI<sub>b3</sub> [-0.28, 0.08],  $p = 0.28$ ) as a non-significant predictor. After controlling for the possible non-independence of the team and sex variables, the latter accounted for the variations in PBC, indicating differences between males and females. That is, the males had higher perceived control to avoid playing when injured compared with the females ( $b = -3.40$ , 95% CI [-5.86, -0.94],  $p < 0.01$ ). A series of independent samples t-tests also supported the latter finding. There was a statistically significant difference in PBC avoidance mean scores for males and females ( $M\Delta = \pm 1.03$ ,  $t(178) = 3.33$ , 95% CI [0.42, 1.64],  $p < 0.001$ ). As indicated by Cohen’s  $d$  effect size (Cohen, 1988), the magnitude of the difference in the means was medium ( $d = 0.76$ , 95% CI [0.30, 1.21]). Notwithstanding the difference in PBC avoidance for males and females, there were no other significant differences in the remaining study variables (e.g., social pressure, attitudes, and subjective norms).



**Figure 2.** Statistical diagram of the parallel multiple-mediator model of the presumed influence on intention to play when injured. Note:  $N = 177$ ; The regression coefficients and the total-, direct-, and indirect-effect values are reported as unstandardized indices. The solid lines represent positive paths and the dashed lines represent negative paths. For ease of presentation, the team and sex, included in the analysis as dummy variables, are not shown in the figure. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

With regard to the multiple-mediator model, it was observed that the relationship between perceived social pressure and intention to play when injured was mediated by attitudes, subjective norms, and situational temptation. More specifically, a higher level of perceived social pressure was shown to be positively related to attitudes in favour of playing when injured, as well as with others' approval and situational temptation to do so, which mediated the relationship between perceived social pressure and intention to play when injured. As for the specific indirect links (see [Figure 2](#)), attitudes ( $b = 0.27$ , 95%  $CI_{a1b1}$  [0.02, 0.68]), subjective norms ( $b = 0.26$ , 95%  $CI_{a2b2}$  [0.01, 0.68]), and situational temptation ( $b = 0.22$ , 95%  $CI_{a4b4}$  [0.03, 0.52]) stood out as unique mediators among all the mediators in the model. However, no significant difference between these three variables was found when their relative strengths as mediators were compared (e.g., contrasting their respective indirect contributions to the mediational model). Thus, one mediator could not be considered stronger than the other. Upon inspecting the remaining mediator in the mediational model, it was revealed that PBC avoidance had no significant mediating effect ( $b = 0.11$ , 95%  $CI_{a3b3}$  [-0.12, 0.39]).

## Discussion

Using the TPB as a theoretical framework, the purpose of the current study was to investigate possible links between social pressure as perceived by junior ice hockey players and their intention to play while injured. This target group is of particular importance for injury prevention because it represents tomorrow's professional players in a sport associated with a high prevalence of injuries (Nordstrøm et al., 2020). Towards this end, we tested a parallel multiple-mediator model linking perceived social pressure to intention to play when injured through attitudes, subjective norms, PBC avoidance, and situational temptation.

In line with our first hypothesis, it was expected that perceived social pressure would be directly and positively related to intention to play when injured. As shown in [Figure 2](#), the direct effect of perceived environmental pressure on intention to play when injured was still present and positive after the mediating variables were added to the model. This finding supports Ajzen's (1991) openness to the inclusion of additional predictors, as long as they capture a significant proportion of the variance in intention after the theory's current variables have been taken into account. In addition, the current study's findings seem to demonstrate the unique contribution of perceived social pressure and its potential ability to influence hockey players' intention to play when injured. Previous studies on sports injuries have shown that external influences (e.g., coaches, peers, parents) represent a set of social interactions and expectations that may increase the risk of injury among athletes (Malcom, 2006; Theberge, 2008). Such social influences incorporate expected social behaviours (e.g., displays of physical and mental toughness) that young athletes consider when they incur an injury (Malcom, 2006). Hence, athletes may be prone to conform to these expectations and learn to deal with injuries by "shaking them off" and "toughing them out" (Malcom, 2006, p. 495). Consequently, given the direct path

between social pressure and intention, it is reasonable to assume that sporting culture may directly impact players' decision to play when injured, irrespective of other psychological influences on the players, such as behavioural beliefs. As indicated by the current study's results, players who perceived social pressure from their sport environment to play through injuries were more likely to report a higher level of intention to play when injured.

According to the study's second hypothesis, perceived social pressure would also be indirectly and positively related to intention to play when injured via attitudes, subjective norms, and situational temptation, while negatively related via PBC avoidance. [Figure 2](#) shows the positive relationship between social pressure and the mediating variable attitudes, which in turn is a positive predictor of intention. In accordance with TPB, attitudes towards injury are concerned with salient behavioural beliefs that playing when injured will lead to more positive than negative consequences (Ajzen, 1991). There are similarities between the attitudes expressed by perceived social pressure in the current study and those described in previous research (Barkoukis et al., 2013), in which the influences of external factors (e.g., mastery approach) were mediated by predictors derived from TPB. The current study's results run parallel to these findings and extend the previous research by showing that attitudes towards injury operate as a mediator in the relationship between perceived social pressure and intention to play despite being injured. It appears that the presence of social pressure to play despite being injured (e.g., from the coach, peers, or parents) may relate to players' intentional behaviour by shaping more favourable attitudes towards doing so. In the current study, results indicated that the higher the perceived social pressure to play through injuries, the more favourable attitudes towards injury and stronger intentions were reported by the players.

The results in [Figure 2](#) also show a positive relationship between perceived social pressure and the mediating variable subjective norms, which is a positive predictor of intention in the next model step. According to Ajzen (1991), subjective norms refer to the perceived approval from important others to keep playing when injured. The current study finding is in line with previous research suggesting that mirroring the social norms of significant others may lead to a stronger intention to perform the behaviour in question by acting on such normative beliefs (Lazuras et al., 2015). As such, the presence of social pressure to play while injured may relate to players' intentions by eliciting beliefs that people close or important to them approve of them playing despite being injured. Notwithstanding their overlapping conceptualizations, these findings may also bring support to the rationale that subjective norms differ theoretically and methodologically from perceived social pressure in that they differ in specific connotations. That is, social pressure denotes players' perception of pressure from their sporting environment to keep playing when an injury occurs. In contrast, subjective norms reflect players' beliefs regarding significant others' opinions about playing when injured and whether they would approve of doing so. Nevertheless, the indirect relation between social pressure and intention via subjective norms should be interpreted with caution. In the

current study, results indicated that the higher perception of social pressure, the more favourable normative beliefs about others' approval of playing when injured, and stronger intentions were reported by the players.

Lastly, the current study's results also show a positive relationship between perceived social pressure and the mediating variable of situational temptation, which in turn, is a positive predictor of intention. Based on Bandura's (1982) concept of self-efficacy, situational temptation refers to the perceived ability to resist game-specific temptations to play when injured. The current study's results support the evidence presented by previous studies that situational temptation acts as a parallel mediator, next to predictors derived from TPB (Lazuras et al., 2010, 2015). In addition, in their meta-analytic review, Blank et al. (2016) identified situational temptation as one of the most influential predictors of sport-related intentions, underlining its potential contribution next to other so-called immediate predictors of intention, such as attitudes and subjective norms. This suggests that players' intention to play when injured may not only be directly related to the perceived social pressure for them to do so; rather, perceived social pressure may also be indirectly related by eliciting a stronger temptation to engage in the game despite being injured (e.g., when the coach suggests so), in turn leading to a higher level of intention to play when injured. In the current study, results showed that the higher perception of social pressure, the more eliciting situational temptations to play despite being injured, and stronger intentions were reported by the players.

Contrary to our expectations, we did not observe a significant indirect relation between perceived social pressure and intention via perceived control to avoid playing when injured (i.e., PBC avoidance). Previous studies on risk behaviours in sports have highlighted the unique contributions of PBC in the prediction of intention (Barkoukis et al., 2013, 2014), but few studies have supported mediation (Lazuras et al., 2015). A possible explanation for the discrepancy between the current study's results and the earlier findings could well be that determinants of intention reflecting the players' beliefs about the ease or difficulty of avoid playing the game when injured have been shown to be less powerful than beliefs about the capacity to resist playing when injured under specific circumstances (Lazuras et al., 2015). Collectively, our results and those of other studies (Barkoukis et al., 2013) may indicate that the measurement of behavioural control concerning the behaviour of avoid playing when injured could benefit from the inclusion of items that reflect self-regulatory efficacy to succumb to social pressure (or overcome them), as compared with more traditional self-efficacy items that are commonly used in most TPB studies which reflect perceived control over the difficulty or easiness to engage in a particular course of action (Conner & Sparks, 2015).

### Practical implications

Consistent with the results of previous studies (Mayer et al., 2018; S. Schneider et al., 2019; Schnell et al., 2014), the current study's results suggest that players who perceive social pressure intend to play when injured. Perceived pressure may increase players' intention to play when injured by shaping

more favourable attitudes and normative beliefs towards doing so and elicit a stronger temptation to keep playing after incurring an injury. Coaches, club physicians, and other people surrounding athletes should be aware of the impact of pressure on athletes and thus help reinforce the environmental conditions that reduce it. For example, establishing cultural norms that combine to form a sports ethic that cultivates long-term perspectives on both players' careers and health can help players refrain from playing when injured. Creating such environmental conditions may reduce the intent to play when injured by facilitating players' behavioural and normative beliefs and capability to resist the temptation to play under risk-conductive circumstances. While it is generally accepted that coaches play a key role within athletes' sports environments, our findings indicate that peers and parents also play important roles in this respect.

### Limitations and strengths

The present study was not free of limitations. First, one limitation was its cross-sectional design, which precludes precedence and causal order by referring to the strength of association between variables, as well as differences between groups and differences in the rate of occurrence in an outcome of interests (VanderWeele, 2015). Another limitation was the procedure used to account for the possible non-independence produced by team membership. Thus, for future research, a prospective design is needed to establish the directionality of the relationships between the independent variables, mediators, and outcomes. To better account for clustering effects (e.g., from groups or organizations), researchers are encouraged to use a multilevel modelling approach (Maas & Hox, 2005). Second, few females were represented in the current study's sample. However, the male and female distribution represented the status quo in Norway in this regard. Researchers will do well to replicate the current model in other sports where stereotyped expectations of masculinity and gender roles play an integral role, thus also including male and female participants. Third, due to its focus on intention to play when injured, the current study did not use any measure of actual behaviour. Recent studies (Hurst et al., 2019; Kavussanu et al., 2020) have shown that indirect measures can be used efficiently when studying health-compromising behaviours. As such, hypothetical scenarios have been shown to evoke the target emotions and activate relevant social knowledge in participants by requiring judgements on how they would be likely to feel, think, or behave in a similar situation. The underlying assumption is that this demand would activate the participants' self-concept and thus reveal their attitudes, perceived norms, and values about the behaviour of interest and, in so doing, maximize predictive accuracy (Petroczi, 2016). Lastly, given the inconsistencies between players' significant others (e.g., coaches, peers, parents), future research should rely on several sources to increase the practical value of the findings.

Notwithstanding the aforementioned limitations, the current study had several strengths. Its primary strength was its formal examination that extended the TPB literature by testing a specific theory-driven model emphasizing the direct and indirect effects of distal and proximal predictors of



intention to play when injured. Furthermore, the study presented an interesting development in theory-driven examinations of risk behaviour in competitive sports in general. To the best of our knowledge, the current study was the first to test a multiple-mediator model linking perceived social pressure to the intentionality to play through injuries in the context of youth sports. In addition, the study had a unique sample representing the most talented players in their age group.

## Conclusion

To conclude, the current study tested a multiple-mediator model and showed that perceived social pressure was directly and positively related to intention to play when injured. In addition, the relationship between the two was also indirectly and positively related via attitudes, subjective norms, and situational temptation pertaining to playing when injured; thus, no indirect negative path was identified for perceived control to avoid playing when injured. Overall, the results help highlight important psychological mechanisms underlying hockey players' decisions to play despite being injured. In particular, players that perceived social pressure from their sporting environment to play despite injury, who perceived more positive than negative consequences of doing so (i.e., behavioural beliefs), who believed that people close or important to them approved of them doing so (i.e., normative beliefs), and who perceived game-specific temptations (i.e., control beliefs), were more likely to report a stronger intent to play the game despite being injured. Coaches and others aiming to prevent health-compromising behaviours such as playing when injured should target players' beliefs about injury and their capability to resist game-specific temptations to play under risk-conducive circumstances. Doing so may reduce players' intent to play when injured.

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## Ethical approval

Ethical approval for this study was granted by the Research Ethics Committee of the Norwegian School of Sport Sciences. Participants gave informed consent to take part.

## Ethical statement

This research has been carried out in accordance with the Norwegian Health Research Act, privacy legislation, and the Act on ethics and integrity in research. All participants gave informed consent to take part in this study.

## Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

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