

## Attributional analysis of psychological safety and burnout among university sports team members during the formative stage of the team

YUHEI KOTANI<sup>1</sup>, YUSUKE SATO<sup>2</sup>, SEIKO SHIRASAKA<sup>3</sup>

<sup>1,2,3</sup>System Design and Management, Keio University, JAPAN

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### Abstract:

**Purpose:** This study examined the characteristics of psychological safety and burnout among Japanese university athletes during the team formative stage. While previous research has established that psychological safety and burnout vary according to athlete status, the influence of specific attributional factors on team development remains unclear. **Approach:** Three hundred twenty-one university athletes completed team psychological safety and athlete burnout scales. Data were analyzed using a multiple-way analysis of variance to investigate differences in psychological safety and burnout based on academic year (first, second, and third), team role (player and staff), and team position (leader and non-leader). **Results:** During the team's formative years, no significant differences were found among the attributes of psychological safety, while significant differences were found by Team Position in Decreased Sense of Personal Accomplishment and Lack of Communication with Teammates. Furthermore, the interaction between Academic Year and Team Role significantly affected Confusion regarding Commitment to Competition factors. **Conclusions:** In the formative phase of a team, all members attempt to adapt to a new situation, resulting in similar perceptions of psychological safety with slight variation. However, significant differences in Team Position in the Decreased Sense of Personal Accomplishment and Lack of Communication with Teammates were confirmed, suggesting that burnout may be preceded by these two factors and be a progressive process. Additionally, the finding that the interaction between Academic Year and Team Role affects Confusion about Commitment to Competition can help coaches better organize their focus to reduce burnout during a team's formative years.

**Keywords:** psychological safety, burnout, forming stage, sports team

### Introduction

Burnout prevention is one of the most critical issues faced by sports. Burnout is "disengagement from sport, indicated by a decreased sense of accomplishment, evaluation of and resentment toward sport, and physical and psychological exhaustion" (Raedeke et al., 2002). Previous research has shown that burnout is a long-term combined experience of individual characteristics, the surrounding environment, and severe stressors (Bezliudnyi et al., 2019; Gustafsson et al., 2011; Lewin & Sager, 2007). Furthermore, in some cases, this can interfere with interpersonal relationships (Da Gama et al., 2018). From the perspective of preventative medicine, scholars have proposed methods for the secondary (early detection and early response) and tertiary (prevention of deterioration) prevention of burnout. However, there are no established methods for primary (proactive) prevention of burnout (Tanaka, 2016).

Previous research has suggested focusing on environmental factors to prevent burnout. Hardy et al. (1996) pointed out that environmental factors and improved individual psychological skills significantly impacted athletes' mental support. Others have highlighted that top athletes experience (and remember) more stress related to the environment, leadership, and organizational factors than to competition, indicating that organization-related stress also needs to be addressed (Hanton et al., 2005; Flentcher & Hanton, 2003). Thus, there is a growing focus on identifying and avoiding the environmental aspects of burnout as a preventative measure.

Weinberg and Goul (2010) presented three perspectives on burnout prevention: 1) encouraging people to express their feelings of dissatisfaction, anxiety, and disappointment and seek help from colleagues and friends; 2) reducing the amount and intensity of training; and 3) learning psychological skills (e.g., relaxation, imagery, goal setting, and positive thinking), which correspond to primary, secondary, and tertiary prevention, respectively. In other words, primary prevention of burnout focuses on encouraging people to express negative feelings and rely on colleagues and friends for help.

In recent years, psychological safety—defined as the shared belief within a team that it is safe to take interpersonal risks (Edmonson, 1999)—has received increasing attention, particularly in the mental health context of sports (Fransen et al., 2020; Kinoshita and Sato, 2023). Notably, psychological safety leads to the creation of an environment in which people feel safe to show "who they are" instead of "putting on a mask," which normalizes a range of mental health-related experiences and leads to increased help-seeking behavior (Walton et al., 2023). Multiple studies have shown that psychological safety can reduce burnout (Fransen et al.,

2020; Kinoshita & Sato, 2023). Moreover, it has been suggested that athletes with high psychological safety also have high self-efficacy (Popovych et al., 2020) and that athletes with high psychological safety also have high motivation for competition (Blynova et al., 2020). Thus, psychological safety contributes to improving athletes' mental health.

However, while previous research suggests that psychological safety may serve as a primary preventative measure for burnout, there is also evidence that the degree of psychological safety and burnout may differ between teams and individual sports (Blynova et al., 2022). This study examined the possibility that the degree of psychological safety and burnout may vary depending on a team's developmental stage. Of course, it is conceivable that psychological safety and burnout may fluctuate during the intervening period. However, we did not find any studies that analyzed psychological safety or burnout regarding teams' developmental stages.

Tackman (1965, 1977) states that teams undergo five developmental stages: forming, storming, norming, performing, and adjourning. The formative stage of teams is characterized by interpersonal relationships and task activities in which group members attempt to discover acceptable interpersonal behaviors based on the reactions of other group members. It is also the stage where group members explore ways of approaching a task (Tackman, 1965). Acuna et al. (2008) pointed out that one of the reasons for low-quality or unsuccessful projects during the project team formation phase is the low psychological team climate. Additionally, Kostina and Torgasheva (2018) found that team members' roles and duties during this stage are unclear, information coordination among team members is weak, there is a lack of interaction and an uneven distribution of load among team members, and there is ambiguity about the project's goals and how to achieve them. Previous studies have demonstrated that relationships are not sufficiently formed in the team formation phase, and how members interact with each other to achieve the team's goals is still not clear. However, in the team formation phase, regardless of their attributes, all members search for ways to deal with their relationships and tasks.

Previous studies have shown that psychological safety and burnout are influenced by health status. Nembhard and Edmondson (2006) found a significant correlation between professional status and psychological safety in American and Canadian healthcare professionals. In some teams, members with a higher professional status (e.g., physicians) and those with a lower professional status (e.g., nurses and respiratory therapists) reported higher levels of psychological safety. In contrast, in other teams, higher-status professionals reported considerably higher levels of psychological safety than lower-status professionals. In a study of airline crew members, Bienefeld and Grote (2014) discovered that individual-level perceptions of their psychological safety mediated the relationships between status and speaking up and between leaders' perceptions of inclusiveness and speaking up within their teams. Newman et al. (2017) suggested that the higher the status of an employee or team, the more individuals feel safe speaking up and sharing ideas. Buunk et al. (2007) conducted a longitudinal cross-sectional study of Spanish teachers and found that lower status or loss of status predicted burnout. The longitudinal results also showed that a sense of defeat in status struggles predicted increased burnout and that status-related variables were more significant predictors than other stressors associated with burnout. Uijan et al. (2022) revealed that residents are more prone to burnout than physicians. Thus, psychological safety and burnout are influenced by status. It should be noted that "status," as indicated in previous studies, includes "objective status," such as professional status (e.g., physicians and nurses or respiratory therapists; Nembhard & Edmondson, 2006 and residents and physicians; Uijan et al., 2022) and "subjective status," such as individuals' perception of their social status and relative attractiveness. In the present study, we used three categorical variables as measures of objective status—Academic Year (first-, second-, or third-year university students), Team Role (athlete, staff), and Team Position (leader, non-leader)—to identify differences in individual-level perceptions of psychological safety and burnout by attribute during the team's inaugural phase (the team's formative stage).

We formulated the hypotheses after selecting the variables. We assumed there was no difference in psychological safety by attribute, as all team members were in the formative stage of exploring how to get around in the team, build relationships, and perform face tasks. Burnout, a characteristic of the Academic Year and Team Role, is not under one's control and can be predicted, to some extent, from the team's dispersal period in the previous year. In Japan, the Academic Year moves by one grade each year, and the team's role often continues over the prior year. (Many players continue to play the following year). Conversely, Team Position is easily influenced by the goals and realities of the new team and cannot be predicted from the previous year's team's scattering period. As positions are determined in light of the new team's goals and other factors, there may be differences in team positions during the team's formative years. In this study, we used Kishi et al.'s (1988) Athletic Burnout Inventory (ABI), a burnout scale widely used in sports in Japan. The ABI consists of four factors: "Emotional Exhaustion in Competition," a state in which athletic activities are emotionally distressing; "Lack of Communication with Teammates," a state in which relationships with others deteriorate; "Decreased Sense of Personal Accomplishment," a state in which one's contribution to the athletic group is diminished; and "Confusion about Commitment to Competition," a state in which the value of athletic activities is reduced.

Based on previous studies, we propose the following:

**Hypothesis 1:** There is no difference in the mean differences in subjective perceptions of team psychological safety by Academic Year, Team Role, and Team Position attributes.

**Hypothesis 2:** There is no difference in the mean overall ABI by Academic Year, Team Role, and Team Position attributes.

**Hypothesis 3:** There is no difference in the mean differences in Emotional Exhaustion in Competition by Academic Year and Team Role; however, there is a difference in Team Position.

**Hypothesis 4:** There will be no difference in the mean differences in Lack of Communication by Academic Year and Team Role; however, there will be a difference in Team Position.

**Hypothesis 5:** There are no differences in Decreased Sense of Personal Accomplishment by Academic Year and Team Role, but there are differences in Team Position.

**Hypothesis 6:** There are no differences in Confusion about Commitment to Competition by Academic Year and Team Role Attributes, but there are differences by Team Position.

## Material and methods

**Participants.** A questionnaire survey was administered to 321 college students from a four-year college athletic team in Japan. Data were collected between November and December 2023. This timeframe was determined based on the Japanese university sports calendar, in which the season for many university sports ends in October or November, and university seniors retire from their teams at the end of the season. New teams for the first three academic year students were established in November or December and did not change until new students joined the team in April of the following year. For those surveyed in this study, the previous season ended in October or November, and the survey was conducted when new teams started to play. The target teams were within one to two months of the establishment of the new team and had not experienced an official game as a new team. Therefore, we judged this period as the team's formative period and proceeded with the analysis. The participants were 138 (43.0%) first-year university students, 87 (27.1%) second-year university students, and 96 (29.9%) third-year university students. Since the teams in this study were in the formative stages of their teams, data were obtained when new teams were established with third-year university students as the most senior students; fourth-year university students were not included in the data. Regarding team roles, 253 (78.8%) were players, 68 (21.2%) were staff, 84 (26.2%) were leaders, and 237 (73.8%) were non-leaders. A total of 139 (43.3%) patients were women and 182 (56.7%) were men. A total of 179 individuals (55.8%) had been playing for less than 5 years, 54 (16.8%) for 5–10 years, and 88 (27.4%) for more than 10 years. The sports played were American football 25 (7.8%), baseball 62 (19.3%), basketball 29 (9.0%), canoeing 20 (6.2%), handball 18 (5.6%), ice hockey 17 (5.3%), lacrosse 74 (23.1%), rugby 22 (6.9%), swimming 35 (10.9%), volleyball 5 (1.6%), and wrestling 14 (4.4%).

**Measures.** Three scales were used in this study: 1) the Team Psychological Safety Scale (Edmondson, 1999); 2) the Athlete Burnout Inventory (ABI; Kishi et al., 1988); and 3) three categorical variables: Academic Year (first-, second-, and third-year university students), Team Role (player, staff), and Team Position (leader, non-leader). For Team Position, respondents were asked to answer "leader" if they held some official leadership position in the team and "non-leader" if they did not hold any official leadership position. Except for the categorical variables in 3), the results were obtained on a seven-point Likert scale.

**Data collection and analysis and Statistical analysis.** Data were statistically processed using MS Excel and IBM SPSS Statistics (version 29). Correlation coefficients were calculated using Spearman's correlation coefficient, and statistical significance between groups was demonstrated using multifactor analysis of variance (multi-way ANOVA). Tukey's post-hoc test was used as the post hoc test when a statistically significant difference was confirmed in the interaction. In addition, to clarify the degree to which burnout differs depending on the score category of psychological safety, we classified the respondents into three groups (high, medium, and low) based on the quartile range of psychological safety. We used an analysis of variance to determine whether there was a difference in the mean values of psychological safety and burnout among the three groups. Specifically, we defined the low group as those with psychological safety scores in the first quartile or lower (25% tile), the medium group as those above the first quartile but below the third quartile (50% tile, median), and the high group as those above the third quartile (75% tile). In this study, differences of  $p < .05$  or less were considered statistically significant.

## Results

A multi-way ANOVA was conducted to determine whether there were differences in individual psychological safety and burnout during the formative stages of the team by attributes (Academic Year, Team Role, and Team Position).

**Descriptive Statistics.** Table 1 presents the descriptive statistics. A higher mean for psychological safety indicated higher psychological safety, while a lower score for burnout (ABI) and its four factors indicated a lower burnout tendency. The mean psychological safety score was 4.92 (SD=0.94), higher than the midpoint score (4.00). The highest mean score for each item on the burnout scale was 3.88 (SD=1.42), indicating a Decreased Sense of Personal Accomplishment. In contrast, Confusion about Commitment to Competition had the lowest score on the burnout scale ( $M=2.10$ ,  $SD=1.21$ ).

Tables II, III, and IV present descriptive statistics for each attribute; descriptive statistics for the Academic Year are presented in Table II.

**Table I.** Descriptive statistics on psychological safety and perceptions of burnout among university athletic team members during the formative stage of the team (n=321)

| Scale                                      | min  | max  | M    | SD   |
|--------------------------------------------|------|------|------|------|
| Psychological Safety                       | 1.71 | 7.00 | 4.92 | 0.94 |
| Burnout(ABI)                               | 1.05 | 5.63 | 2.85 | 0.87 |
| Emotional Exhaustion in Competition        | 0.89 | 5.88 | 2.39 | 1.07 |
| Decreased Sense of Personal Accomplishment | 1.00 | 7.00 | 3.88 | 1.42 |
| Lack of Communication with Teammates       | 1.00 | 7.00 | 2.92 | 1.53 |
| Confusion about Commitment to Competition  | 1.00 | 7.00 | 2.10 | 1.21 |

Note: min – minimum of distribution; max – maximum of distribution; M – arithmetic mean of distribution; SD – mean-square deviation of distribution

**Table II.** Descriptive statistics by academic year on psychological safety and perceptions of burnout among university athletic team members during the formative stages of the team (n=321)

| Academic year | Scale                                      | frequency | min  | max  | M    | SD   |
|---------------|--------------------------------------------|-----------|------|------|------|------|
| First         | Psychological Safety                       | 138       | 3.14 | 7.00 | 4.87 | 0.84 |
|               | Burnout(ABI)                               | 138       | 1.05 | 5.16 | 2.97 | 0.86 |
|               | Emotional Exhaustion in Competition        | 138       | 0.89 | 5.88 | 2.50 | 1.12 |
|               | Decreased Sense of Personal Accomplishment | 138       | 1.00 | 7.00 | 4.16 | 1.37 |
|               | Lack of Communication with Teammates       | 138       | 1.00 | 7.00 | 3.01 | 1.54 |
|               | Confusion about Commitment to Competition  | 138       | 1.00 | 6.00 | 2.03 | 1.17 |
| Second        | Psychological Safety                       | 87        | 1.71 | 6.86 | 4.96 | 1.00 |
|               | Burnout(ABI)                               | 87        | 1.05 | 4.89 | 2.75 | 0.83 |
|               | Emotional Exhaustion in Competition        | 87        | 1.00 | 5.50 | 2.31 | 0.97 |
|               | Decreased Sense of Personal Accomplishment | 87        | 1.00 | 6.40 | 3.75 | 1.37 |
|               | Lack of Communication with Teammates       | 87        | 1.00 | 6.33 | 2.76 | 1.41 |
|               | Confusion about Commitment to Competition  | 87        | 1.00 | 5.33 | 2.12 | 1.24 |
| Third         | Psychological Safety                       | 96        | 2.29 | 7.00 | 4.96 | 1.03 |
|               | Burnout(ABI)                               | 96        | 1.21 | 5.63 | 2.75 | 0.91 |
|               | Emotional Exhaustion in Competition        | 96        | 0.89 | 5.75 | 2.31 | 1.08 |
|               | Decreased Sense of Personal Accomplishment | 96        | 1.00 | 6.00 | 3.58 | 1.48 |
|               | Lack of Communication with Teammates       | 96        | 1.00 | 7.00 | 2.94 | 1.64 |
|               | Confusion about Commitment to Competition  | 96        | 1.00 | 7.00 | 2.18 | 1.24 |

Note: min – minimum of distribution; max – maximum of distribution; M – arithmetic mean of distribution; SD – mean-square deviation of distribution

First-year university students had the lowest mean psychological safety score ( $M=4.87$ ,  $SD=0.84$ ), whereas second- and third-year university students had comparable scores (second-year university students:  $M=4.96$ ,  $SD=1.00$ ; third-year university students:  $M=4.96$ ,  $SD=1.03$ ). Regarding the mean score for each item on the burnout scale, first-year university students had the highest overall burnout scores ( $M=2.97$ ,  $SD=0.86$ ), whereas second- and third-year university students had similar scores (second-year university students:  $M=2.75$ ,  $SD=0.83$ ; third-year university students:  $M=2.75$ ,  $SD=0.91$ ).

The Emotional Exhaustion in Competition was also the highest among first-year university students ( $M=2.50$ ,  $SD=1.12$ ), while second- and third-year university students were at the same level (second-year university students:  $M=2.31$ ,  $SD=0.97$ ; third-year university students:  $M=2.31$ ,  $SD=1.08$ ). The Decreased Sense of Personal Accomplishment was highest among first-year university students ( $M=4.16$ ,  $SD=1.37$ ) and lowest among third-year university students ( $M=3.58$ ,  $SD=1.48$ ). The Lack of Communication with Teammates was highest among first-year university students ( $M=3.01$ ,  $SD=1.54$ ) and lowest among second-year university students ( $M=2.76$ ,  $SD=1.41$ ). The Confusion about Commitment to Competition was highest among third-year university students ( $M=2.18$ ,  $SD=1.24$ ) and lowest among first-year university students ( $M=2.03$ ,  $SD=1.17$ ).

Descriptive statistics for team roles are presented in Table III. The mean psychological safety score was higher for staff members ( $M=5.03$ ,  $SD=0.90$ ) than for players. On the burnout scale, Confusion about Commitment to Competition was lower for players ( $M=2.07$ ,  $SD=1.19$ ); however, all other items were lower for staff. Finally, descriptive statistics by Team Position are presented in Table IV.

**Table III.** Descriptive statistics by team role on psychological safety and perceptions of burnout among university athletic team members during the formative stages of the team ( $n=321$ )

| Team Role | Scale                                      | frequency | min  | max  | M    | SD   |
|-----------|--------------------------------------------|-----------|------|------|------|------|
| Player    | Psychological Safety                       | 253       | 1.71 | 7.00 | 4.89 | 0.95 |
|           | Burnout(ABI)                               | 253       | 1.05 | 5.63 | 2.86 | 0.88 |
|           | Emotional Exhaustion in Competition        | 253       | 0.89 | 5.88 | 2.40 | 1.06 |
|           | Decreased Sense of Personal Accomplishment | 253       | 1.00 | 7.00 | 3.93 | 1.43 |
|           | Lack of Communication with Teammates       | 253       | 1.00 | 7.00 | 2.93 | 1.53 |
|           | Confusion about Commitment to Competition  | 253       | 1.00 | 7.00 | 2.07 | 1.19 |
| Staff     | Psychological Safety                       | 68        | 3.29 | 6.86 | 5.03 | 0.90 |
|           | Burnout(ABI)                               | 68        | 1.21 | 4.58 | 2.78 | 0.83 |
|           | Emotional Exhaustion in Competition        | 68        | 1.00 | 5.13 | 2.35 | 1.13 |
|           | Decreased Sense of Personal Accomplishment | 68        | 1.20 | 6.60 | 3.67 | 1.38 |
|           | Lack of Communication with Teammates       | 68        | 1.00 | 6.33 | 2.89 | 1.57 |
|           | Confusion about Commitment to Competition  | 68        | 1.00 | 5.33 | 2.21 | 1.28 |

Note: min – minimum of distribution; max – maximum of distribution; M – arithmetic mean of distribution; SD – mean-square deviation of distribution

**Table IV.** Descriptive statistics by team position on psychological safety and perceptions of burnout among university athletic team members during the formative stages of the team ( $n=321$ )

| Team Position | Scale                                      | frequency | min  | max  | M    | SD   |
|---------------|--------------------------------------------|-----------|------|------|------|------|
| Leader        | Psychological Safety                       | 84        | 2.86 | 6.71 | 4.99 | 0.88 |
|               | Burnout(ABI)                               | 84        | 1.21 | 4.74 | 2.64 | 0.86 |
|               | Emotional Exhaustion in Competition        | 84        | 0.89 | 4.75 | 2.35 | 1.01 |
|               | Decreased Sense of Personal Accomplishment | 84        | 1.00 | 6.20 | 3.29 | 1.38 |
|               | Lack of Communication with Teammates       | 84        | 1.00 | 6.00 | 2.59 | 1.49 |
|               | Confusion about Commitment to Competition  | 84        | 1.00 | 5.33 | 2.10 | 1.23 |
| Non-Leader    | Psychological Safety                       | 237       | 1.71 | 7.00 | 4.90 | 0.96 |
|               | Burnout(ABI)                               | 237       | 1.05 | 5.63 | 2.92 | 0.86 |
|               | Emotional Exhaustion in Competition        | 237       | 0.89 | 5.88 | 2.41 | 1.09 |
|               | Decreased Sense of Personal Accomplishment | 237       | 1.00 | 7.00 | 4.09 | 1.38 |
|               | Lack of Communication with Teammates       | 237       | 1.00 | 7.00 | 3.04 | 1.54 |
|               | Confusion about Commitment to Competition  | 237       | 1.00 | 7.00 | 2.10 | 1.20 |

Note: min – minimum of distribution; max – maximum of distribution; M – arithmetic mean of distribution; SD – mean-square deviation of distribution

The mean psychological safety score was higher for leaders ( $M=4.99$ ,  $SD=0.88$ ) than for non-leaders ( $M=4.90$ ,  $SD=0.96$ ). For each item on the burnout scale, leaders and non-leaders had similar means for Confusion about Commitment to Competition (leader:  $M=2.10$ ,  $SD=1.23$ ; non-leader:  $M=2.10$ ,  $SD=1.20$ ), whereas leaders had lower implies for the other items.

*Multi-Way ANOVA.* Table V shows the results of the multi-way ANOVA, including testing the hypotheses and checking for interactions to determine whether there were significant differences by attribute.

**Table V.** Multi-way ANOVA on psychological safety and perceptions of burnout among university athletic team members during the formative stages of the team

| Attribution                               | Scale                                      | Type III Sum of Squares | degrees of freedom | mean square | F value | p-value |
|-------------------------------------------|--------------------------------------------|-------------------------|--------------------|-------------|---------|---------|
| Academic year                             | Psychological Safety                       | 0.581                   | 2                  | 0.291       | 0.322   | 0.725   |
|                                           | Burnout(ABI)                               | 0.885                   | 2                  | 0.442       | 0.595   | 0.552   |
|                                           | Emotional Exhaustion in Competition        | 3.051                   | 2                  | 1.526       | 1.323   | 0.268   |
|                                           | Decreased Sense of Personal Accomplishment | 2.772                   | 2                  | 1.386       | 0.729   | 0.483   |
|                                           | Lack of Communication with Teammates       | 2.227                   | 2                  | 1.114       | 0.486   | 0.616   |
|                                           | Confusion about Commitment to Competition  | 5.373                   | 2                  | 2.687       | 1.850   | 0.159   |
| Team Role                                 | Psychological Safety                       | 0.521                   | 1                  | 0.521       | 0.576   | 0.449   |
|                                           | Burnout(ABI)                               | 0.470                   | 1                  | 0.470       | 0.632   | 0.427   |
|                                           | Emotional Exhaustion in Competition        | 0.140                   | 1                  | 0.140       | 0.122   | 0.728   |
|                                           | Decreased Sense of Personal Accomplishment | 3.638                   | 1                  | 3.638       | 1.913   | 0.168   |
|                                           | Lack of Communication with Teammates       | 0.127                   | 1                  | 0.127       | 0.055   | 0.814   |
|                                           | Confusion about Commitment to Competition  | 0.423                   | 1                  | 0.423       | 0.291   | 0.590   |
| Team Position                             | Psychological Safety                       | 0.287                   | 1                  | 0.287       | 0.318   | 0.573   |
|                                           | Burnout(ABI)                               | 1.382                   | 1                  | 1.382       | 1.857   | 0.174   |
|                                           | Emotional Exhaustion in Competition        | 0.879                   | 1                  | 0.879       | 0.763   | 0.383   |
|                                           | Decreased Sense of Personal Accomplishment | 18.606                  | 1                  | 18.606      | 9.785   | 0.002** |
|                                           | Lack of Communication with Teammates       | 13.651                  | 1                  | 13.651      | 5.953   | 0.015** |
|                                           | Confusion about Commitment to Competition  | 0.006                   | 1                  | 0.006       | 0.004   | 0.949   |
| Academic year * Team Role                 | Psychological Safety                       | 0.330                   | 2                  | 0.165       | 0.182   | 0.833   |
|                                           | Burnout(ABI)                               | 2.795                   | 2                  | 1.398       | 1.879   | 0.155   |
|                                           | Emotional Exhaustion in Competition        | 0.192                   | 2                  | 0.096       | 0.083   | 0.920   |
|                                           | Decreased Sense of Personal Accomplishment | 4.024                   | 2                  | 2.012       | 1.058   | 0.348   |
|                                           | Lack of Communication with Teammates       | 12.333                  | 2                  | 6.166       | 2.689   | 0.070   |
|                                           | Confusion about Commitment to Competition  | 10.902                  | 2                  | 5.451       | 3.754   | 0.024*  |
| Academic year * Team Position             | Psychological Safety                       | 0.829                   | 2                  | 0.414       | 0.459   | 0.633   |
|                                           | Burnout(ABI)                               | 0.151                   | 2                  | 0.076       | 0.102   | 0.903   |
|                                           | Emotional Exhaustion in Competition        | 0.943                   | 2                  | 0.472       | 0.409   | 0.665   |
|                                           | Decreased Sense of Personal Accomplishment | 0.543                   | 2                  | 0.272       | 0.143   | 0.867   |
|                                           | Lack of Communication with Teammates       | 0.565                   | 2                  | 0.282       | 0.123   | 0.884   |
|                                           | Confusion about Commitment to Competition  | 3.429                   | 2                  | 1.714       | 1.181   | 0.308   |
| Team Role * Team Position                 | Psychological Safety                       | 0.099                   | 1                  | 0.099       | 0.110   | 0.740   |
|                                           | Burnout(ABI)                               | 0.064                   | 1                  | 0.064       | 0.086   | 0.770   |
|                                           | Emotional Exhaustion in Competition        | 0.569                   | 1                  | 0.569       | 0.494   | 0.483   |
|                                           | Decreased Sense of Personal Accomplishment | 1.488                   | 1                  | 1.488       | 0.782   | 0.377   |
|                                           | Lack of Communication with Teammates       | 2.331                   | 1                  | 2.331       | 1.016   | 0.314   |
|                                           | Confusion about Commitment to Competition  | 0.251                   | 1                  | 0.251       | 0.173   | 0.678   |
| Academic year * Team Role * Team Position | Psychological Safety                       | 1.082                   | 2                  | 0.541       | 0.598   | 0.550   |
|                                           | Burnout(ABI)                               | 0.767                   | 2                  | 0.384       | 0.516   | 0.598   |
|                                           | Emotional Exhaustion in Competition        | 1.531                   | 2                  | 0.766       | 0.664   | 0.515   |
|                                           | Decreased Sense of Personal Accomplishment | 0.852                   | 2                  | 0.426       | 0.224   | 0.799   |
|                                           | Lack of Communication with Teammates       | 0.025                   | 2                  | 0.012       | 0.005   | 0.995   |
|                                           | Confusion about Commitment to Competition  | 3.509                   | 2                  | 1.754       | 1.208   | 0.300   |

Note: \*\*\*p&lt;0.001, \*\*p&lt;0.01, \*p&lt;0.05

**Table VI.** Post-test for academic year \* team role interaction of Confusion about Commitment to Competition

| Dependent variable                        | Academic year | Team Role | M     | standard error | 95% CI |       |
|-------------------------------------------|---------------|-----------|-------|----------------|--------|-------|
|                                           |               |           |       |                | Lower  | Upper |
| Confusion about Commitment to Competition | First         | Player    | 1.957 | 0.200          | 1.563  | 2.350 |
|                                           |               | Staff     | 1.821 | 0.442          | 0.952  | 2.690 |
|                                           | Second        | Player    | 1.991 | 0.180          | 1.637  | 2.345 |
|                                           |               | Staff     | 2.953 | 0.386          | 2.194  | 3.712 |
|                                           | Third         | Player    | 2.298 | 0.143          | 2.018  | 2.579 |
|                                           |               | Staff     | 1.854 | 0.253          | 1.355  | 2.353 |

Note: M – arithmetic mean of distribution

Significant differences were identified in Decreased Sense of Personal Accomplishment and Lack of Communication with Teammates ( $p<0.01$ ); the values were significantly lower for leaders than for non-leaders. We confirmed that the interaction between Academic Year and Team Role significantly affected Confusion about Commitment to Competition Items ( $p<0.05$ ). Therefore, we performed a post hoc Tukey's test (Table VI).

The post-test results confirmed a significant mean difference between second-year university players and staff members (second-year university players:  $M=1.991$ ; second-year university staff:  $M=2.953$ ).

*Analysis of variance according to psychological safety score.* Based on the results of this study, the first, second, and third quartiles of psychological safety were 4.14, 4.86, and 5.57, respectively. Thus, the PS-low group was defined as those with a quartile of 4.14 or less, the PS-medium group as those with a quartile greater than 4.14 and less than 5.57, and the PS-high group as those with a quartile greater than 5.57. The results showed that 64 (20.0%), 167 (52.0 %), and 90 (28.0 %) patients were in the low, middle, and high groups, respectively. Table VII provides the descriptive statistical results.

The ANOVA results were analyzed to determine whether there were statistically significant differences among the items in the low, medium, and high groups (Table VIII). Before ANOVA, Levene's test was used to check for equality of variance. Equal variances were confirmed for burnout (ABI; overall) and Lack of Communication with Teammates; however, unequal variances were found for other items. Therefore, Welch's one-way ANOVA was conducted for the four items with unequal variance. Significant differences were observed for all survey items used in this study ( $p < 0.001$ ). Therefore, Tukey's  $y$  test was used as a post-test for the two items that confirmed equal variance, and the Games-Howell method was used for the four items with unequal variance. The results showed that although no significant differences were identified between the high and medium groups in Emotional Exhaustion in Competition and Decreased Sense of Personal Accomplishments, statistically significant differences were identified in the other factors.

**Table VII.** Descriptive statistics with three group comparisons of psychological safety

| Group           | Scale                                      | frequency | min  | max  | M    | SD   |
|-----------------|--------------------------------------------|-----------|------|------|------|------|
| PS-Low group    | Psychological Safety                       | 64        | 1.71 | 4.00 | 3.66 | 0.41 |
|                 | Burnout(ABI)                               | 64        | 1.71 | 7.00 | 3.40 | 0.89 |
|                 | Emotional Exhaustion in Competition        | 64        | 0.89 | 5.75 | 2.78 | 1.14 |
|                 | Decreased Sense of Personal Accomplishment | 64        | 1.00 | 7.00 | 4.37 | 1.44 |
|                 | Lack of Communication with Teammates       | 64        | 1.00 | 7.00 | 3.87 | 1.60 |
|                 | Confusion about Commitment to Competition  | 64        | 1.00 | 7.00 | 2.78 | 1.31 |
| PS-Medium group | Psychological Safety                       | 167       | 4.14 | 5.43 | 4.78 | 0.42 |
|                 | Burnout(ABI)                               | 167       | 1.05 | 5.63 | 2.96 | 0.78 |
|                 | Emotional Exhaustion in Competition        | 167       | 0.89 | 5.88 | 2.52 | 1.13 |
|                 | Decreased Sense of Personal Accomplishment | 167       | 1.00 | 7.00 | 4.01 | 1.25 |
|                 | Lack of Communication with Teammates       | 167       | 1.00 | 6.33 | 2.98 | 1.40 |
|                 | Confusion about Commitment to Competition  | 167       | 1.00 | 6.00 | 2.18 | 1.21 |
| PS-High group   | Psychological Safety                       | 90        | 5.57 | 7.00 | 6.09 | 0.42 |
|                 | Burnout(ABI)                               | 90        | 1.21 | 5.05 | 2.24 | 0.66 |
|                 | Emotional Exhaustion in Competition        | 90        | 1.00 | 4.25 | 1.88 | 0.66 |
|                 | Decreased Sense of Personal Accomplishment | 90        | 1.00 | 6.40 | 3.28 | 1.53 |
|                 | Lack of Communication with Teammates       | 90        | 1.00 | 7.00 | 2.14 | 1.32 |
|                 | Confusion about Commitment to Competition  | 90        | 1.00 | 4.67 | 1.47 | 0.72 |

Note: min – minimum of distribution; max – maximum of distribution; M – arithmetic mean of distribution; SD – mean-square deviation of distribution

**Table VIII.** Results of grouped ANOVA based on psychological safety

| dependent variable                         | Post-hoc test method | Low group=0,<br>Medium group=1,<br>High group=2 | Mean Difference | standard error | p-value | 95% CI |        |            |       |
|--------------------------------------------|----------------------|-------------------------------------------------|-----------------|----------------|---------|--------|--------|------------|-------|
|                                            |                      |                                                 |                 |                |         | Lower  | Upper  | Difference |       |
| Psychological Safety                       | Games-Howell         | 0                                               | 1               | -1.12647*      | 0.061   | 0.000  | -1.271 | -0.982     | 0.289 |
|                                            |                      | 2                                               | -2.43105*       | 0.068          | 0.000   | -2.591 | -2.271 | 0.321      |       |
|                                            |                      | 1                                               | 0               | 1.12647*       | 0.061   | 0.000  | 0.982  | 1.271      | 0.289 |
|                                            |                      | 2                                               | -1.30458*       | 0.055          | 0.000   | -1.434 | -1.176 | 0.258      |       |
|                                            |                      | 0                                               | 2               | 2.43105*       | 0.068   | 0.000  | 2.271  | 2.591      | 0.321 |
|                                            |                      | 1                                               | 1               | 1.30458*       | 0.055   | 0.000  | 1.176  | 1.434      | 0.258 |
| Burnout(ABI)                               | Tukey HSD            | 0                                               | 1               | .44089*        | 0.113   | 0.000  | 0.175  | 0.707      | 0.533 |
|                                            |                      | 2                                               | 1.15417*        | 0.126          | 0.000   | 0.858  | 1.450  | 0.593      |       |
|                                            |                      | 1                                               | 0               | -.44089*       | 0.113   | 0.000  | -0.707 | -0.175     | 0.533 |
|                                            |                      | 2                                               | .71328*         | 0.101          | 0.000   | 0.476  | 0.950  | 0.474      |       |
|                                            |                      | 0                                               | -1.15417*       | 0.126          | 0.000   | -1.450 | -0.858 | 0.593      |       |
|                                            |                      | 1                                               | -.71328*        | 0.101          | 0.000   | -0.950 | -0.476 | 0.474      |       |
| Emotional Exhaustion in Competition        | Games-Howell         | 0                                               | 1               | 0.25377        | 0.167   | 0.286  | -0.143 | 0.650      | 0.793 |
|                                            |                      | 2                                               | .89623*         | 0.158          | 0.000   | 0.519  | 1.274  | 0.755      |       |
|                                            |                      | 1                                               | 0               | -0.25377       | 0.167   | 0.286  | -0.650 | 0.143      | 0.793 |
|                                            |                      | 2                                               | .64246*         | 0.112          | 0.000   | 0.379  | 0.906  | 0.526      |       |
|                                            |                      | 0                                               | .89623*         | 0.158          | 0.000   | -1.274 | -0.519 | 0.755      |       |
|                                            |                      | 1                                               | -.64246*        | 0.112          | 0.000   | -0.906 | -0.379 | 0.526      |       |
| Decreased Sense of Personal Accomplishment | Games-Howell         | 0                                               | 1               | 0.35677        | 0.204   | 0.192  | -0.128 | 0.842      | 0.970 |
|                                            |                      | 2                                               | 1.08875*        | 0.241          | 0.000   | 0.518  | 1.660  | 1.142      |       |
|                                            |                      | 1                                               | 0               | -0.35677       | 0.204   | 0.192  | -0.842 | 0.128      | 0.970 |
|                                            |                      | 2                                               | .73198*         | 0.188          | 0.000   | 0.287  | 1.177  | 0.889      |       |
|                                            |                      | 0                                               | -1.08875*       | 0.241          | 0.000   | -1.660 | -0.518 | 1.142      |       |
|                                            |                      | 1                                               | -.73198*        | 0.188          | 0.000   | -1.177 | -0.287 | 0.889      |       |
| Lack of Communication with Teammates       | Tukey HSD            | 0                                               | 1               | .88776*        | 0.209   | 0.000  | 0.397  | 1.379      | 0.982 |
|                                            |                      | 2                                               | 1.73275*        | 0.232          | 0.000   | 1.187  | 2.279  | 1.092      |       |
|                                            |                      | 1                                               | 0               | -.88776*       | 0.209   | 0.000  | -1.379 | -0.397     | 0.982 |
|                                            |                      | 2                                               | .84500*         | 0.186          | 0.000   | 0.408  | 1.282  | 0.874      |       |
|                                            |                      | 0                                               | -1.73275*       | 0.232          | 0.000   | -2.279 | -1.187 | 1.092      |       |
|                                            |                      | 1                                               | -.84500*        | 0.186          | 0.000   | -1.282 | -0.408 | 0.874      |       |
| Confusion about Commitment to Competition  | Games-Howell         | 0                                               | 1               | .60361*        | 0.189   | 0.005  | 0.154  | 1.053      | 0.899 |
|                                            |                      | 2                                               | 1.31088*        | 0.181          | 0.000   | 0.880  | 1.742  | 0.863      |       |
|                                            |                      | 1                                               | 0               | -.60361*       | 0.189   | 0.005  | -1.053 | -0.154     | 0.899 |
|                                            |                      | 2                                               | .70727*         | 0.121          | 0.000   | 0.422  | 0.992  | 0.570      |       |
|                                            |                      | 0                                               | -1.31088*       | 0.181          | 0.000   | -1.742 | -0.880 | 0.863      |       |
|                                            |                      | 1                                               | -.70727*        | 0.121          | 0.000   | -0.992 | -0.422 | 0.570      |       |

Note: \* – Difference in means is significant at the 0.05 level.

*Hypothesis Results.* The conclusions regarding our hypotheses are as follows. First, our conjecture in Hypothesis 1, "There is no difference in the subjective perception of psychological safety of the team among the attributes of Academic Year, Team Role, and Team Position," was correct; the obtained results did not confirm any significant differences among the attributes. Therefore, Hypothesis 1 is supported. Hypothesis 2, "There is no difference in overall ABI between Academic Year and Team Role, but there is a difference by Team Position," was partially correct; the obtained results were not significantly different among all attributes. Thus, Hypothesis 2 is partially supported.

Hypothesis 3, "There are no differences in Emotional Exhaustion in Competition between Academic Year and Team Role, but there are differences within Team Position," was partially correct; the obtained results were not significantly different among all attributes. Thus, Hypothesis 3 is partially supported. Hypothesis 4, "There are no differences in Lack of Communication with Teammates within Academic Year and Team Role attributes, but there are differences within Team Position," was also confirmed by our results, with significant differences only by Team Position. Thus, Hypothesis 4 is supported.

Hypothesis 5, "There are no differences in Decreased Sense of Personal Accomplishment within Academic Year and Team Role attributes, but there are differences within Team Position," was confirmed to be significant only for Team Position. Therefore, Hypothesis 5 is supported. Hypothesis 6, "There are no differences in Confusion about Commitment to Competition among Academic Year and Team Role attributes, but there are differences within Team Position," was not significantly different among all attributes. Thus, Hypothesis 6 is partially supported.

## Discussion

In this section, we discuss the hypotheses based on these results. Regarding Hypothesis 1, the results indicated some stages of team development in which differences in psychological safety by attribute were not confirmed. As discussed in a previous study, the team's formative stage is a period when each member has to adapt to many new events and situations, such as the way they behave and conduct themselves within the team, how they form and maintain relationships with others, and how they cope with tasks. The fact that no significant differences were found among the three attributes used in this study suggests that regardless of the attribute, the perception of psychological safety of all team members may be at the same level during the formation phase of the team. Future research should be conducted longitudinally to determine at which point in the team's developmental stage differences exist in individual-level perceptions of psychological safety and for which attributes.

Regarding Hypotheses 2 through 6, significant differences (leader < non-leader) were confirmed by Team Position for Decreased Sense of Personal Accomplishment and Lack of Communication with Teammates. In line with our results, previous studies have partially confirmed differences in team positions during the formative stage of the team.

The Maslach Burnout Inventory (MBI; Maslach & Jackson, 1981), which is widely used outside the sports context, has revealed that the components of burnout are related to each other (Golembiewski & Munzenrider, 1984; Leiter & Maslach 1984; Leiter & Maslach, 1988; Lewin & Sager, 2007). In light of this, the present study's finding that there are significant differences between a Decreased Sense of Personal Accomplishment and Lack of Communication with Teammates in the formative stages of the team, depending on whether the team is a leader or not, suggests that these two variables may be the leading factors among the four aspects of the ABI construct. Future research should continue to investigate which factors are significantly different at which stages of a team's development after clarifying the process of burnout tendencies.

Finally, we confirmed that the interaction between the Academic Year and Team Role significantly affected Confusion about Commitment to Competition. The post-test results confirmed a significant difference between staff and players in their second year of college. Second-year college students are in the middle academic year; as such, they are characterized by the complexity of the team position of both first- and third-year university students. In addition, considering the characteristics of the team's role, the number of players vying for positions and selection for games may be more significant and more intense than that of the staff, and they are in an environment with a high mental load, competing against seniors and third-year university students for positions and selections. For players, Confusion about Commitment to Competition may be noticeably higher than that of staff. In the future, longitudinal and qualitative studies should clarify the impact of the Academic Year multiplied by Team Role.

Furthermore, the results of the between-group comparison of the three groups based on mean psychological safety support Hypothesis 1. Specifically, the range of 95% confidence intervals (CIs) suggests that psychological safety may be narrower than the burnout items, with more minor differences. Furthermore, the results of Hypotheses 2 through 6 support the results of Hypothesis 2, suggesting that the range of the 95% CIs for Decreased Sense of Personal Accomplishment and Lack of Communication with Teammates was extensive. In addition, each burnout variable had at least a lower limit of 95% CI of 0.47, indicating that the differences were more comprehensive than those for psychological safety. Thus, while the variation in psychological safety was slight during the team's formative years, the variation in burnout was considerable compared to psychological safety.

## Conclusions

Unlike previous studies, there were no significant differences in the perceived psychological safety by attribute during the formative stage of the team, indicating that all members perceived the same level of psychological safety. During the formative stage of the team, leaders had a significantly lower sense of personal accomplishment and Lack of Communication with Teammates than non-leaders. Thus, these two variables may be antecedents of burnout. When the academic year and team role were multiplied during the formative stage of the team, a statistically significant effect was identified on the Confusion about Commitment to Competition between second-year university athletes and staff members. When the high, medium, and low psychological safety groups were divided, the range of the upper and lower psychological safety scores was small.

In contrast, the wide range for each burnout factor confirmed a similar degree of perceived psychological safety. The results of this study suggest that the degree of perceived psychological safety may vary greatly depending on the developmental stage of the team and an individual's attributes. During the team formation stage, it is necessary to improve the psychological safety of all team members. However, because this study was conducted with a specific sample of university athletes in Japan, caution is needed when generalizing the findings. In the future, it will be necessary to conduct additional research on attributes such as gender and age in addition to the personal qualities obtained in this study, as it has been suggested that there may be differences in burnout between teams from different cultural spheres, teams other than university students, and gender (De Moraes et al., 2019; Tyshchenko et al., 2019), and further verification of the robustness of this study is required.

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