

Direct and Indirect Effect of Hardiness on Mental Health Among Japanese University Athletes

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Abstract. This study examined direct and indirect effects of hardiness on mental health among Japanese university athletes. Participants were 760 university athletes (men = 524, women = 236, $M_{age} = 19.9$, $SD = 1.22$). The questionnaire comprised demographic information (gender, role in team), the Revised Athlete Hardiness Scale (RAHS), the Adolescent Resilience Scale (ARS) and General Health Questionnaire-30 (GHQ-30). For men, RAHS score had a direct negative effect on GHQ scores, while for women, RAHS score had no effect on GHQ score. In regular players, the RAHS score had a direct negative effect on GHQ scores, while in non-regular players, It had no effect on GHQ scores. In conclusion, hardiness directly influenced mental health among Japanese university athletes and the influence of hardiness on mental health differed by gender and team role. This suggests that hardiness may be a factor in promoting mental health among Japanese male and regular athletes.

Keywords: Hardiness · Resilience · Mental health · University athlete

1 Introduction

University athletes are exposed to many stresses because of their exposure to various competitive activities, in addition to stressors such as academic achievement and interpersonal relationships in university school settings [1]. For example, stress factors include conflict of human relationships with supervisors and teammates, excessive competition, difficulties in achieving compatibility with study, lack of pleasure, and experiences of failure [2]. Thus, researchers are exploring various viewpoints in order to flexibly cope and respond to these stress factors. Specifically, researches have been increasing focusing on the concepts of hardiness and resilience.

Hardiness is defined as an “attitude to support stress countermeasures of resilience, a concept that refers to skills [3].” If hardiness (commitment, control and challenge) is

high, people can maintain mental and physical health even under stressful circumstances [4].

Resilience is a proximity concept of hardiness. It is defined as “resilience in the psychological aspect of an individual who can recover it even if the mental state falls into a negative state under difficult circumstances [5].”

Hardiness and resilience are common concepts in terms of psychological strength under adversity. As a reason for this, Nakanishi and Tamase [6] studied what role hardiness and resilience played in a stress situation. It was observed that, Hardiness and resilience directly relieved stress and this increased stress coping, affected reevaluation of cognition, and relieved stress indirectly. In addition, since hardiness has a more prominent effect in enhancing coping than resilience, improving hardiness is regarded as a basic way of treating stress [6]. According to Rahimian and Asgharnejad [7], hardiness and resilience showed a significant negative correlation with anxiety and depression. They further reported that people who were high in hardiness and resilience could deal with various adverse events. In addition, in the sports field, Karamipour, Hejazi, and Yekta [8] studied hardiness and resilience of athletes and non-athletes. They suggested that athletes were higher in hardiness and resilience than non-athletes. For these reasons, the concepts should not be evaluated a good or bad but the functions and merits of both concepts should be considered. Given this context, several papers and books have been published on these concepts, such as “Hardiness as the Pathway to Resilience [9],” “Does Hardiness Improve Resilience? [10],” and “Personal Hardiness as the Basis for Resilience [9].” Thus, under stress, hardiness should be paid more attention compared with resilience [11, 12]. Since this view is similar to that of Nakanishi and Tamase [6], it is safe to assume that hardiness has a higher impact on stress than resilience.

Therefore, in this study, we dealt with the concepts of hardiness and resilience and examined the influence of these on mental health. Moreover, based on the study of Nakanishi and Tamase [6], we assumed that hardiness is the root of human mind and we constructed a hypothesis model. The hypothetical model of this study is a model that predicts the relationship between athlete’s hardiness, resilience, and mental health. We also examined the direct and indirect effect of hardiness on mental health by mediating resilience.

2 Method

2.1 Participants

We collected data from 511 Japanese university athletes (305 men, 206 women). Mean age was 19.9 ± 1.21 and age range was 18–22 years. The survey was conducted in October 2016.

2.2 Measurements

Socio-demographic Questions. We asked the students about their gender, age, grade, sports event, and competitive level. The responses were analyzed using both description and the selection formula.

Revised of Athletic Hardiness Scale (RAHS). This scale comprised 12 items of 3 factors (commitment, control, and challenge). The subjects responded to all the items of each question, and their responses were scored on a 4-point scale, ranging from “I completely disagree” (1 point) to “I completely agree” (4 points). Regarding the reversal item, the score was reversed. The average of total item scores was calculated.

The Adolescent Resilience Scale (ARS). This scale comprised 21 items of 3 factors (novelty seeking, emotional regulation, and positive future orientation). Participants responses to the items were scored on a 5-point scale, ranging from “disagree” (1 point) to “agree” (5 points).

General Health Questionnaire-30 (GHQ-30). This scale had 30 items to assess mental health. The total score was the sum of the scores obtained. We adopted the Goldberg scoring method (0–0–1–1) that assigns a score of 0 for responses 1 and 2 and a score of 1 for responses 3 and 4.

2.3 Ethical Consideration

The Research Ethics Committee of the School of Health and Sports Science, Juntendo University approved this study. Prior to the study, we obtained written informed consent from all participants. Each participant was made aware of his or her right to decline cooperation at any time without repercussions, even after consenting to participate.

2.4 Statistical Analysis

First, gender differences and competition level differences of all variables were examined.

Second, to clarify the causal relationship between hardiness and resilience and mental health, we verified the model using covariance structure analysis. Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA) were used as goodness of fit indices for the model. When a statistically significant difference was confirmed in gender differences and competition level differences, simultaneous analysis of multiple populations was used in covariance structure analysis to preside gender and the competition level. In the estimation method of analysis, the maximum likelihood method was used and the variance of each latent variable was also constrained to one, and each path from the error variable to the observation variable was constrained to one to secure the discrimination of the model. We used SPSS 22.0 and AMOS22.0 for analysis.

3 Results and Discussion

3.1 Demographic Information of Participants

Table 1 shows mean, standard deviation, and correlation coefficients of hardiness (RAHS), resilience (ARS), and mental health (GHQ-30). There was a significant negative correlation between hardiness, resilience, and mental health, respectively.

Table 1. Descriptive statistics and correlations of hardiness, resilience, and mental health

	1	2	3	4	5	6	7	8	9	Mean	SD
1. GHQ-30	–									6.6	5.14
2. RAHS	–.30**	–								35.7	5.76
3. Commitment	–.30**	.73**	–							12.1	2.52
4. Control	–.26**	.80**	.37**	–						11.4	2.46
5. Challenge	–.14**	.78**	.31**	.50**	–					12.2	2.5
6. ARS	–.29**	.52**	.34**	.47**	.40**	–				77.4	11.15
7. Positive future orientation	–.25**	.43**	.26**	.40**	.34**	.79**	–			19.7	3.66
8. Emotional regulation	–.30**	.46**	.33**	.43**	.30**	.80**	.41**	–		31.2	5.39
9. Novelty seeking	–.14**	.38**	.23**	.23**	.34**	.84**	.62**	.45**	–	26.4	4.69

** $p < .01$

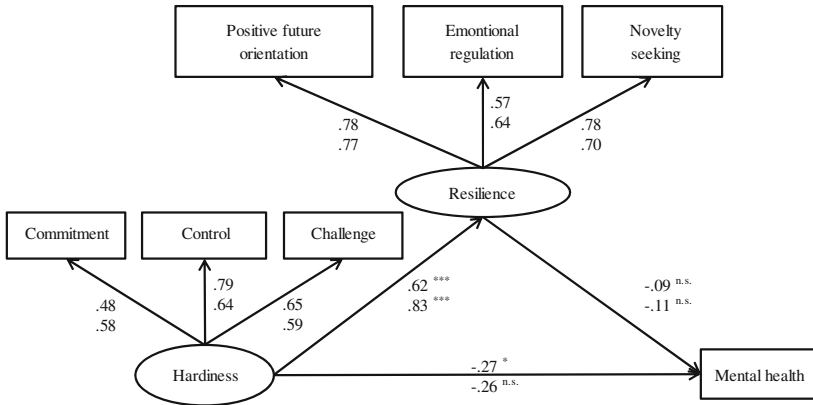
Note: GHQ-30: General Health Questionnaire-30, RAHS: Revised of Athletic Hardiness Scale, ARS: The Adolescent Resilience Scale.

3.2 Multiple Group Structure Modeling

Figure 1 shows the differences in mental health with consideration of gender (men or women). For men, hardiness had a direct negative effect on mental health scores, while for women, hardiness had no effect. In men, the direct effect from hardiness to mental health was confirmed, but in women, it was not confirmed. Specifically, the direct effect pass coefficient was $-.27$ ($p < .05$) for men, and $-.26$ ($p < n.s.$) for women.

Figure 2 shows the differences in mental health with consideration of athlete's role in their team (regular player or non-regular player). In regular players, the hardiness had a direct negative effect on mental health, while in non-regular players, hardiness had no effect on mental health. In regular players, the direct effect from hardiness to mental health was confirmed, but in non-regular players, it was not confirmed. Specifically, the direct effect pass coefficient was $-.41$ ($p < .01$) for regular player, and $-.25$ ($p < n.s.$) for non-regular player.

Indirect effect of hardiness on mental health through resilience was .05 in men, .09 in women, .02 in regular player, and .08 in non-regular player. Both of the assumed models were significant at 0.1% level. Regarding the goodness-of-fit indicator, for gender, GFI = .95, AGFI = .88, CFI = .91, and RMSEA = .08, and for athlete's role in their team, GFI = .94, AGFI = .87, CFI = .90, and RMSEA = .08.

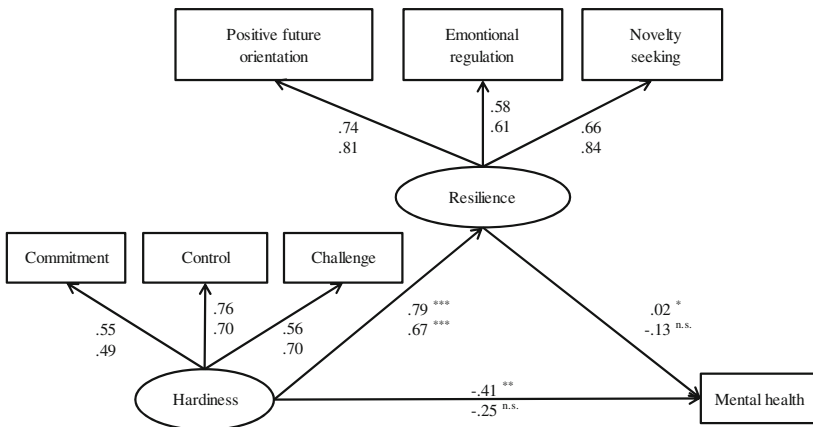


GFI = .95, AGFI = .88, CFI = .91, RMSEA = .08

* $p < .05$, ** $p < .001$, n.s. = not significant

Note: The upper row shows men and the lower row shows women.

Fig. 1. The multiple group structure modeling on gender



GFI = .94, AGFI = .87, CFI = .90, RMSEA = .08

* $p < .05$, ** $p < .01$, *** $p < .001$, n.s. = not significant

Note: The upper row shows regular player and the lower row shows non-regular player.

Fig. 2. The multiple group structure modeling on athlete's role in their team

4 Discussion

Regarding gender, results suggested that hardiness directly affected mental health in men, while in women, hardiness did not have the same affect. Regarding the role of team, results suggested the hardiness directly affected mental health in regular players but not in non-regular players. Regarding the direct and indirect effects examination, only the direct effect was significant. On the other hand, the direct effect of resilience

had a lower impact than hardiness. Moreover, indirect effect of examination showed that the direct effect of hardiness was higher than mediation of resilience.

These results suggest that mental health is improved when hardiness is high. Hardiness had a stronger effect on mental health than resilience did. In fact, enhancing coping led to higher hardiness than resilience [6]. Thus, people who are high in hardiness actively cope with problems and perform cognitive reevaluation. Moreover, the path coefficient of hardiness from resilience had a strong positive value. From this finding, we can conclude that enhancing hardiness also contributes to improving resilience.

The reason why the indirect effect was not significant is because there was no significant stress event between hardiness and resilience. Some kind of stress event is important because resilience is the “psychological aspect of an individual who can recover it even if the mental state falls into a negative state under difficult circumstances.” On another front, hardiness can help an individual to flexibly respond to stress. For instance, combination of attitudes that provides the courage and motivation to do the hard, strategic work of turning stressful circumstances from potential disasters into growth opportunities [13]. In addition, hardiness has an adaptive effect to encourage retention of mental and physical health under stress and further enhance performance in academic and work [14]. However, a number of researches on resilience have focused on recovery from trauma experience. This means recovering from an extreme stress event (trauma experience) that cannot be dealt with hardiness is where resilience plays a more important role. Maddi and Khoshaba [15] also suggested that the “Hardiness → resilience → stress reaction” model should be adopted. Moreover, athletes have better mental health and can be more successful in their life because these two factors (hardiness and resilience) increase their perseverance when faced with difficult problems of life [8]. Therefore, we suggest that enhancing both hardiness (for overcoming stress) and resilience (for recovering from stress) contribute to improvement in mental health.

5 Conclusion

We conclude that hardiness directly influences mental health among Japanese university athletes, and that the influence of hardiness on mental health differs by gender and team role. This suggests that hardiness may be a factor in promoting mental health among Japanese male and regular athletes.

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