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# Development and Validation of Psychological Skills Scale for Hockey Players and Cricketers

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The present research was carried to develop an indigenous, valid, and reliable scale to assess psychological skills of hockey players and cricketers. An initial item pool of 130 items was generated through detailed, open-ended, and semi-structured interviews with six international hockey players and two international cricketers, whereas, a preliminary questionnaire was administered on 518 players (261 hockey players and 257 cricketers). Principal Factor Analysis with Varimax rotation postulated 84 items with three distinct factors: Psycho-Performance Skills, Perceived Psychological Support, and Psycho-Competitiveness. The internal consistency of the items for Psychological Skills Scale for Hockey Players and Cricketers was determined by using Cronbach's alpha that emerged .94 for final 84 items, whereas, Psycho-Performance Skills, Perceived Psychological Support, and Psycho-Competitiveness had .92, .90, and .87 reliability; respectively. Further researches can be conducted to confirm these three factors extracted through this study by including other sports or considering various other psychological skills of hockey players and cricketers. This research would be helpful for Pakistan Hockey Federation and Pakistan Cricket Board to determine psychological profiling of cricketers and develop psychological profiling system based on the results of Psychological Skills Scale for hockey players and cricketers.

*Keywords.* Psychological skills, hockey players, cricketers, scale development

Nowadays, psychological skills are regarded as part and parcel in physical activities, particularly, in team sports where players have to manage their physical abilities with the help of different psychological

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skills. Performance and consistency is dependent on psychological factors that is, confidence, commitment, concentration, and control. Psychological skills determine a player's ability to be a champion in brutal circumstances and these skills not only enable him or her to keep moving, but also helpful in competitive conditions (Bali, 2015; Collins, Button, & Macnamara, 2010). A sportsman's mental approach can be constructed during practice sessions. The major problem of international hockey players and cricketers is that the most talented players are unable to sustain their psychological approach and physical competence under pressure (Orlick, 2016; Van Raalte & Brewer, 2014). Sports psychology, supporting psychologically and enabling players to cope with stressful situations in a better way, enhances physical performance dramatically and change defeat into victory. During practice, attitude development of players is as important as physical fitness, because many studies have revealed that under stressful situations, even the gifted fail to synchronize their psychological approach with physical competence (Anderson, Hanrahan, & Mallett, 2014). Moreover, psychological components are very helpful in coping with pre-competition stress and avoiding choking during competition (Barker, Neil, & Fletcher, 2016; Williams & Krane, 2015). Psychological components along with physical fitness help team sports players to handle competitive performance (Olmedilla, Garcia-Mass, & Ortega, 2017).

Along with physical and technical abilities, psychological and behavioral characteristics are also very useful to cope with competition stress as the mental side becomes more important when one gets to an international level in his or her sports (Portenga, Aoyagi, & Cohen, 2017). Psychological practices are being used at a large scale by coaches helping players in maintaining control and maximizing their performance during different competitive situations to concentrate positively at different uphill tasks. Switching off and on during field determines success and the switching can be easy for refocusing attention only on good things (Taylor, 2018). The prime performance pyramid conceptualization of developing important contributors individual and team sports performance. Sports specific coaching is needed for the development of functional skills and participation with players in functional performance training guarantees successful performance (Arthur, Fitzwater, Roberts, Hardy, & Arthur, 2017).

The prime performance model characterizes balance between functional movement patterns, functional performance, and psychological skills that are adequate for optimal level of performance. This pyramid is divided into three levels; firstly, basic

skill; secondly, preparatory skills; and thirdly, performance skills (Arthur et al., 2017; Baillie, Davis, & Ogilvie, 2014). The first step in the development of psychological skills is the identification of the importance of these skills, but their nature varies across different sports. These mental skills establish a wide base for achieving long-term goals and uphill tasks with long lasting requirement of practice from coaches to assist their players in the application of basic skills into their sports (Baillie et al., 2014). Preparatory skills are used before competition for optimal performance in a specific performance action (Van Raalte & Brewer, 2014; Van Raalte, Vincent, & Brewer, 2017). Performance skills are used during optimal performance behavior. Basic skills and preparatory skills form the bases of performance skills and each of higher level skill integrates preceding level (Abdullah, Musa, Maliki, Kosni, & Suppiah, 2016). Players respond physically and psychologically to the increased level of stress due to competition that can negatively influence their performance resulting in being tense, speeding heart rate, sweating, and being worried about the competition (Bali, 2015).

Coaches are very keen in psychological aspects of sports and pointed out techniques to remain focused in competitive situation and controlling negative emotions for optimal performance. The coach is arguably a very important person influencing youths' general sport experience (Gledhill, Harwood, & Forsdyke, 2017). On the other hand, coaches have the potential to induce anxiety and burnout in athletes, and ultimately dropout from the sport. Therefore, coaches play a critical role in either hindering or strengthening an athlete's involvement and motivation for sports (Swann et al., 2017). Players obtain a limited goal while aiming only for winning, whereas, competitiveness is an amount of perception, focus, determination and energy that a player puts into for a struggle to win (Shields & Bredemeier, 2011). Competitive people have a strong desire to achieve and succeed, thereby demonstrating their competency to themselves and others.

Bali (2015) operationalized achievement goal theory by defining it as depending on what goal a player is trying to achieve. Abdullah et al. (2016) also coined distinction between competition and form of competition and defined competition as a thrive for seeking excellence through the mutual challenge that opponents provide to each other and work as a major hindrance for a professional player to achieve optimal performance by being psychologically fit and mentally prepared. Therefore, Barker et al. (2016) described three phases of psychological skills preparation, that is, pre-performance, during performance, and coping strategies. Pre-performance phase include

visualization and self-talk. The performance phase emphasize the important psychological needs of the players during different stages of the event. The coping strategies include different plans to help out players with any kind of distraction and haphazard situation before, during, or after the event.

Solomon and Kausar (2017) conducted a study to examine knowledge and awareness of cricketers about psychological skills and their perception of significance of psychological skills in cricket. For this purpose, a qualitative study was carried out on the sample of eleven cricketers. Data gathered through focus group and individual interviews was transcribed and subjected to thematic analysis. Main themes emerged included that change in nature of cricket over the period of time had warranted the need for psychological skills; psychological skills mainly comprised of several components that is, sense of cohesiveness; psychological control; psychological preparation; freshness of mind; and adherence to instruction of coaches for mental strengths. Psychological skills have been perceived to be important for cricketers to enable them deal with pressure effectively and help them develop positive mind set. Therefore, the challenge for sportsmen is to achieve and sustain such psychological state that enhances their performance and that is only possible through optimal use of psychological skills (Kudlackova, Eccles, & Dieffenbach, 2013). Team sports are 90% mental game and apart from physical fitness and cricket skill, an area of strength team sports players seems to display is that of being able to handle pressure and manage their own self-doubt (Abdullah et al., 2016). On the other hand, the greatest challenge for Pakistan Cricket Board (PCB) and Pakistan Hockey Federation (PHF) and its management is to develop a progressive training model for the betterment of psychological skills of their players by analyzing their psychological strengths and weaknesses and being supportive in controlling anxious responses, lowering the probability of a player being put in choking situation, restoring self-confidence and, motivation; improve positive outlook and enhancement of performance. Therefore, the objective of this study was to construct a reliable and valid scale to measure psychological skills of hockey players and cricketers.

## Method

The development and validation of the Psychological Skills Scale For Hockey Players and Cricketers (PSSHPC) was carried out in two phases. Phase I incorporated construction and

validation after generating initial item pool by conducting interviews of hockey players and cricketers; however, Phase II encompassed determining psychometric properties of the newly developed scale.

## Phase 1: Construction and Validation of Psychological Skills Scale for Hockey Players and Cricketers

Phase I was carried out to construct and validate an indigenous scale to measure psychological skills of hockey players and cricketers. This work was built upon preliminary work that was done only on the sample of cricketers (Solomon & Kausar, 2015). However, now it was extended by including hockey players and statements generated from interviews and focus group discussions of cricketers were taken from previous work and were merged with newly constructed items from hockey players and two cricketers (for current study). In-depth, semistructured and detailed interviews were conducted with six international hockey players of Pakistan International Hockey Team and two international cricketers of Pakistan International Cricket Team to develop PSSHPC in Urdu, the national language of Pakistan aiming comprehensive and thorough information from the participants. Scale development involved two steps. Step I was conceptualization of the construct through interviews; whereas, Step II comprised of item generation for PSSHPC.

**Conceptualization of the construct.** First of all the construct was conceptualized on the basis of previous literature and theoretical background (Gledhill et al., 2017; Weinberg & Gould, 2014). After conceptualization of the construct, it was important to construct items that properly and accurately reflected psychological skills of hockey players and cricketers. For this purpose, interview guide was prepared with the help of previous literature and theoretical framework of four C's model of sports psychology which states that confidence, commitment, concentration, and control are key components of sports psychology.

**Interview questions for generation of item pool.** Interview guide was prepared with the help of previous literature, theoretical framework of 4 C's model and initial work done by Solomon and Kausar (2015). Hence, the sample interview questions for interviews from cricketers and hockey players for scale constructions were generated. Interview guide consisted of eight questions: (1) What is the role of psychological health along with physical fitness in sports? (2) What do you know about psychological skills being used in sports? (3) Which playing strategy you adopt during game? (4) In

your opinion, which types of psychological skills are necessary during game? (5) Which types of psychological skills are beneficial for increasing your performance? (6) Specify the reasons that are influential on your psychological skills? (7) Lacking of which type of psychological skills divert your attention from match? (8) Anything else you want to tell.

In-depth, semistructured and detailed interviews were conducted with six international hockey players ($n$ = 3 defenders; $n$ = 3 mid-fielders; $n$ = 1 goal keeper) and two international cricketers ($n$ = 1 batsman; $n$ = 1 all-rounder) with age range of 24-29 years ($M$ = 27.13, $SD$ = 1.31) for item generation. Researchers approached only those hockey players and cricketers Pakistan Hockey Federation (PHF) and Pakistan Cricket Board (PCB); respectively, who have represented Pakistan in different tournaments and events at international level. Formal permission from concerned authorities and consent from players were also sought. Before starting the interviews, all the participants were briefed about the nature and purpose of the study.

Participants were ensured that information provided by them would be kept confidential and would not be used other than the research purposes. Instructions were provided to the participants. They were encouraged to provide their true opinion and views regarding psychological skills used by them in their respective sport, that is, hockey and cricket. All the interviews conducted in PHF and National Cricket Academy (NCA) were audio-taped. Each interview lasted for 20 to 25 minutes. The recorded interviews were then transcribed and initial item pool consisting of 130 items was generated from the verbatim. Irrelevant items were deleted whereas repeated items were submerged. Moreover, all the items were carefully reviewed.

Initial item pool consisted of 130 items with 4-point Likert scale measuring the strength of the responses (1 = *Never*, 2 = *Sometimes*, 3 = *Often*, 4 = *Always*). Total score on the scale ranged from 130 (minimum) to 520 (maximum) where minimum scores marked low level of psychological skills and maximum scores postulated as higher level of psychological skills.

## Phase 2: Determining Psychometric Properties of PSSHPC

Phase II was aimed at determining factorial structure with the help of Exploratory Factor Analysis lead by carrying out reliability analysis.

**Sample.** Generally, it is viewed that the larger sample is better for validating the research scale. However, Tabachnick and Fiddle

(2007) postulated that the sample of 300 is adequate for factor analysis. Moreover, the criteria of 4:1 (4 cases per item) has been reported. The sample of 518 players (i.e., 261 hockey players and 257 cricketers) were approached for the empirical evaluation from different hockey academies and cricket clubs from different cities of Punjab.

**Construct validity.** Principal Component Analysis (PCA) was carried out on 130 initial item pool. The suitability of the factor analyzed, different assumptions were tested empirically. There are number of options suggested Harrell (2001) to be followed for testing sampling adequacy. Bartlett's test of sphericity was observed as highly significant $\chi^2$ (8385) = 26234.44, $p < .001$ which indicated correlations between items was sufficiently large for PCA (Hutcheson & Sofroniou, 1999). Scree plot was generated and Eigen values for factor 1, 2 and 3 were appropriate. Kaiser-Myers Test of Sampling Adequacy showed the value of .91.

To determine how many components (factors) to be extracted, there was a need to consider a few pieces of information provided in the output. Using Kaiser's (1970) criterion, the interest was only in components that have an Eigen value of 1 or more. Cattell's scree plot (1966) criterion calls for retaining those factors that lie above point of inflation of the plot. The scree plot (Figure 1) suggested three factors solutions.

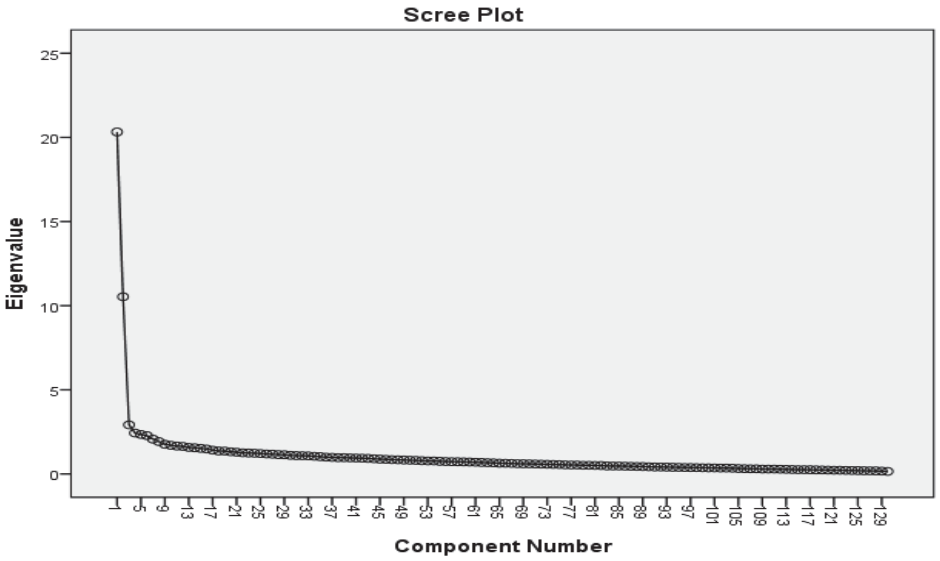


*Figure 1.* Scree plot showing the extraction of factors for PSSHPC.

Scree plot presented in Figure 1 shows the extraction of factors. Scree plot extracted three factors, therefore, Principal Component Analysis with three factors was carried out. Items for the sub-scales

were selected on the criteria of having factor loadings of .40 and above (Harrell, 2001). These three factors were labeled as following:

***Factor 1: Psycho-Performance Skills.*** The Eigen value for Factor 1 was 12.44 which accounted for 9.57% of variance having 38 items that were reverse coded. For example, "My bad performance detracts me from my match planning", "I bully opponents to bounce back from match pressure"; "My morale decreases when my team mates are not performing well before me", and "Overconfidence is harmful for my performance".

***Factor 2: Perceived Psychological Support.*** The Eigen value for Factor 2 was 11.74 which accounted for 9.03% of variance including 24 items. For example, "My coach's motivation before match increases my performance", "I try to perform better than game plan given by my coach"; "I control myself if I am being cursed by others during match"; and "My game improves by feedback of my friends about my game".

***Factor 3: Psycho-Competitiveness.*** The Eigen value for Factor 3 was 9.58 which accounted for 7.37% of variance having 22 items. For example, "I try to be committed to achieve my goal during match", "My commitment encourages me in difficult situations during match", "I perform well when I play without being pressurized," and "The more I think about my game, the more I concentrate on my game".

**Scoring procedure.** The overall scoring range of PSSHPC was 84 to 336, however, three subscales i.e. Psycho-Performance Skills, Perceived Psychological Support and Psycho-Competitiveness postulated 38 to 152; 24 to 96 and 22 to 88 respectively. The cutoffs of the scores were determined by using quartile scores which divided total scores into three quartiles: $< 25$ = poor, $\geq 25$ and $< 50$ = average, and $\geq 50$ and $< 75$ = adequate; $\geq 75$ = excellent psychological skills.

**Reliability and item analysis.** After using Cronbach's alpha, the alpha reliability coefficient for 84 items of internal consistency of PSSHPC was found to be .94. In addition, subscales Psycho-Performance Skills, Perceived Psychological Support, and Psycho-Competitiveness acquired reliability coefficients of .92, .90, and .87; respectively.

Moreover, total item correlation indicated that all items were adequately related with factors of PSSHPC. So these items were indicated in the scale.

Table 1

*Inter-Correlations Between Subscales and Total Scores of Psychological Skills Scale for Hockey Players and Cricketers for Total Sample (N = 518)*

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Psycho-Performance Skills | - | .26* | .27* | .81* |
| 2. Percieved Psychological Support | | - | .70* | .73* |
| 3. Psycho-Competitiveness | | | - | .71* |
| 4. Psychological Skills Scale (Total) | | | | - |

*$p$< .001.

The results in Table 1 indicates that all three factors (Psycho-Performance skills, Perceived Psychological Support and Psycho-Competitive skills) have significant positive relationships with each other and also with total score of PSSHPC.

Table 2

*Inter-Correlations Between Subscales and Total Scores of Psychological Skills Scale for Hockey Players and Cricketers*

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Psycho-Performance | - | .28* | .20* | .83* |
| 2. Perceived Psychological Support | .24* | - | .65* | .72* |
| 3. Psycho-Competitiveness | .31* | .73* | - | .65* |
| 4. Psychological Skills Scale (Total) | .80* | .74* | .76* | - |

*Note.* Upper diagonal = hockey players, Lower diagonal = cricketers.

*$p$ < .001.

The results in Table 2 indicates that all three factors (Psycho-Performance Skills, Perceived Psychological Support and Psycho-Competitive Skills) were significant positively related with each other and also with total score of PSSHPC.

Table 3

*Descriptive Statistics of the Psychological Skills Scale for Hockey Players and Cricketers (N = 518)*

| Subscales | *k* | *a* | *M*(*SD*) | Quartiles | | | Scoring Range |
|---|---|---|---|---|---|---|---|
| | | | | 25 | 50 | 75 | |
| Psycho-Performance Skills | 38 | .92 | 115.49(19.80) | 103 | 118 | 130 | 38-152 |
| Perceived Psychological Support | 24 | .90 | 81.92(11.00) | 76 | 83 | 91 | 24-96 |
| Psycho-Competitiveness | 22 | .87 | 77.55(8.63) | 74 | 79 | 84 | 22-88 |
| Psychological Skills | 84 | .94 | 274.98(30.54) | 255 | 282 | 299 | 84-336 |

*Note. K=no. of items;* Quartiles: < 25 = poor; ≥25 and < 50 = average; and ≥ 50 and < 75 = adequate and ≥75 = excellent psychological skills.

Table 3 shows mean, standard deviation, quartiles and reliability coefficient of PSSHPC. Cronbach's alpha found to be excellent for psychological skills scale and its sub-scales. The quartiles for the scale and subscale determine psychological skills as poor, adequate and excellent. Moreover, scoring range for the scale and each subscale is also given while the mean of scores fall in the given range.

## Discussion

The multidisciplinary science of sport psychology is becoming increasingly important in sport sciences. The primary focus of sport psychological training and counseling is to monitor the effects of healthy and specialized performance enhancement and thus the players' psyche (Kudlackova et al., 2013). Mental preparation aims to enhance the athlete's performance, monitor the athlete's psychological state, and achieve an empirically well-founded intervention, taking into account the wide-ranging diagnostic of individual-specific features. All this can be the key to an athlete's success, as international trends are increasingly reflecting that the outcome of a world competition depends to a great extent on the athlete's psychological state (Danielsen, Rodahl, Giske, & Høigaard, 2017). On the other hand, applied sport psychology is the application of psychological principles of human performance in helping athletes consistently perform in the upper range of their capabilities and more thoroughly enjoy the sport performance process (Portenga et al., 2017). Psychological skills play a vital role in improving performance and fundamental component is mental practicing and rehearsal to train the mind for elite competition. Coaches and officials can help players by enabling them to practice and allowing reflecting on the benefits of psychological skills that encompass learned behaviors employed by players pragmatically and paved their way towards distinction in sports (Kantos, 2017; Lowe, 2017). Psychological skills are vital qualities helpful to attain excellence in performance during forceful competition and highly demanding situation. Psychological skills are fundamental factors of performance comprising cognitive abilities that can be polished through psychological skills training (Solomon & Kausar, 2017). These skills lead players towards elite performance during critical situations of the match, therefore, it can be postulated that performance is a process that is learnt with the help of different types of psychological and mental abilities (Danielsen et al., 2017). Psychological skills' training is an organized preparation of psychological skills for the enhancement of performance, achieving enjoyment in sports, and

satisfaction from physical activity (Orlick, 2016). By viewing sporting context in Pakistani perspective, psychological issues in sports have never been discussed in Pakistan and have always been an ignorant part of the team sports, whereas, physical characteristics have always been a hot topic for Pakistan Hockey Federation and Pakistan Cricket Board, therefore, a study was carried out to develop PSSHPC.

After running Exploratory Factor Analysis, three factors were labeled as Psycho-Performance Skills, Perceived Psychological Support and Psycho-Competitiveness. The overall score range was 84 to 336 and the internal consistency of the items for PSSHPC was determined by using Cronbach's alpha. Psychological skills are attributed as skills that are helpful during match and are being influenced by different psychological factors i.e., confidence, motivation, pressure handling and mutual communication and understanding. Perceived psychological support postulated as direct or indirect support and motivation that influence players during match. Psychological support included motivation from coaches, confidence from captain and humor or mutual talks with other team members during match. Psycho-competitiveness included to different psychological skills that help players during crucial match situations such as self-talk, imagery and planned ignoring for pressure situations (Anderson et al., 2014; Olmedilla et al., 2017). Hockey players and cricketers are thought to be able to enhance their performance on tasks in their domains by regulating their psychological state through the use of basic psychological skills: Confidence, commitment, concentration and control (Danielsen et al., 2017). These skills include advanced psychological skills, such as the ability to regulate anxiety and basic psychological skills such as self-talk that underpin use of psychological skills during crucial situations. Psychological assessment is also part and parcel for exact overview of utilization of psychological tactics during competition by hockey players and cricketers (Solomon, 2019).

Now-a-days, team sports players are using different psychological techniques to assist themselves in maintaining control, coping with anxiety, and optimizing performance in competitive situation. Physical fitness is necessary, but the importance of psychological strength cannot be denied (Orlick, 2016). The key to be a good sportsman is to have the ability to tackle the psychological aspects of the game but mental preparation is often neglected in sports and knowing oneself is one of the difficult tasks for everyone and it requires a decade of hard work. Earlier comprehension regarding psychological skills was based on only elite athletes or an individual sport, that's why exploration regarding specific sports needed to be

taken under consideration (Arthur et al., 2017; Danielsen et al., 2017; Gledhill et al., 2017). It has been discussed many times that Pakistani players tend to be choked during pressure situations in many important international events (Solomon, 2015). Moreover, further studies can be conducted to confirm these three factors extracted through this study by including other team sports other than hockey and cricket or considering various different psychological skills for individual sports.

## Implications

Psychological profiling of team sports players is need of the hour and for this purpose a valid and reliable indigenous scale for assessment of psychological skills of team sports players. PSSHPC would be helpful for assessing players psychologically on different domains. These results can be helpful for initiating awareness in hockey players and cricketers on psychological skills training programs that can boost players psychologically and provide a better chance for coaches and management for understanding players from psychological point of view as well.

## Limitations and Suggestions

First limitation is that only cricket and hockey athletes were recruited. Future studies should include players from different team sports that is football, baseball, basketball and volleyball. Secondly, only male hockey players and cricketers were included in the study, however, future researches can be conducted by considering the gender of players. Utilizing different sports by considering the gender of player will not only increase number of participants but will also allow researchers to make comparisons across gender and different sports.Future researchers should also consider family related demographics that is, family system, number of siblings, socioeconomic status, etc. as they might have a significant influence on psychological skills of players and their comprehension of using these skills in the field as well.

## Conclusion

The primary purpose of this research was the development of Psychological Skills Scale for Hockey Players and Cricketers. Principal Factor Analysis showed three factors: Psycho-Performance Skills, Perceived Psychological Support, and Psycho-Competitiveness with satisfactory reliabilty. This scale can be used as a screening tool

for psychological assessment and profiling of players by Pakistan Hockey Federation and Pakistan Cricket Board.

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