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ORIGINAL RESEARCH

Strategic insights into penalty kick execution: A comprehensive analysis of observable behaviors in the German Bundesliga

Guilherme Pinheiro[1,2], Pascal Feber[1]

[1] Chair of Performance Analysis and Sport Informatics, Department of Sports and Health Sciences, Technical University of Munich, Munich, Germany.
[2] UFMG Soccer Science Center, Sports Department, Federal University of Minas Gerais, Belo Horizonte, Brazil.

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Abstract

This study aimed to investigate which observable variables would be able to predict the penalty taker strategy; and to identify the prevalence of the penalty taker strategy in successful penalty kicks. Dataset consists of 220 penalty kicks from the German Bundesliga (2019-2021). Video-based performance analysis of in-match penalty kicks was performed. Chi-squared ($\chi 2$) test and logistic regression (enter method) analyses were performed to investigate the relationship between observable behaviors and the penalty-taker strategy. The following behavior: gaze behavior at the ball, no deception, number of steps more than 3, perceived ball speed as powerful shot, run up speed fast, penalty kick shot height at the center or down, kicking technique instep kick, and run up approach frontal was related to the goalkeeper independent strategy ($\chi 2$ (177) = 211.049, 96%, $p < .001$). In successful penalty kicks the independent goalkeeper strategy was more adopted (59.87%). The differentiation between penalty kick patterns provides scientific and practical insights as it enables researchers to identify patterns in the German Bundesliga. Through analysis of the kicker's running pattern, deception actions, gaze behavior, and kicking technique, football practitioners may attempt to determine the kicker's favored approach, and ultimately the penalty kick strategy, so they can inform coaching staff and players.

Introduction

Penalty kicks are of enormous importance when conducted within the game, due to the high probability to score (i.e., 70-80% success rate; Bar-Eli & Azar, 2009; Fariña et al., 2013) and because of the number of goals scored in an average football game is very low (about 2-3; Sánchez-Flores et al., 2016). Penalty kicks also play a decisive role in major football events (Brinkschulte et al., 2020), for instance, the World Cup 2022 was decided by penalty shootouts. Until 2018, a total of 48 penalty shootouts have decided knock-out matches in the FIFA World Cup or UEFA European Championship since 1976, which means that 22.3% of the knock-out matches were determined with a penalty shootout (FIFA, 2018; UEFA, 2018). This implies that the goalkeeper's and kicker's performance during the brief time of the penalty kick is tremendous (Azar & Bar-Eli, 2023).

Considering that the penalty kick is one of the most pressured moments in a competitive match (Sarmento et al., 2017), and it can directly influence the outcome of the match, an optimal penalty kick strategy is crucial to successful performance (Dalton et al., 2015). The penalty-taker strategy is commonly distinguished as being either goalkeeper-dependent or goalkeeper-independent (Kuhn, 1988). Adopting the "goalkeeper-independent" strategy the penalty taker has a pre-established plan about the direction of the kick and ignores any action of the goalkeeper during the preparatory period (run-up). Alternatively, using the "goalkeeper-dependent" strategy the kicker intends to take advantage of the goalkeeper's anticipatory action. During the run-up, the penalty taker tries to obtain information from the actions of the goalkeeper to anticipate which side the goalkeeper will dive (Kuhn, 1988; Pinheiro et al., 2021).

Only a small number of performance analysis studies have proposed instruments to analyze strategies in penalty kicks (e.g., Noël et al., 2015; Comas et al., 2018). Comas et al. (2018) indicated a relationship between the spatial position of the support foot and the opposite

✉ G. S. Pinheiro, e-mail: guilherme.gsp11@hotmail.com
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arm to the shooting foot with the direction of the ball on the penalty kick, both for right-footed and left-footed players. Noël et al. (2015) identified three variables (i.e., attention to the goalkeeper, run-up fluency, and kicking technique) that in combination could predict 92% of the penalty-taker strategy. Nevertheless, many factors can affect penalty kick performance (Pinheiro et al., 2021), such as kinematics (Li et al., 2015), body orientation (Pinheiro et al., 2022), gaze behavior (Noël & van der Kamp, 2012), footedness (Almeida et al., 2016), situational (Almeida et al., 2016), and psychological (Wood et al., 2015). Besides that, when identifying strategies for the penalty kick, one must consider the emerging results of the "penalty taker-goalkeeper" dyadic interaction (Lames, 2006; Lames and McGarry, 2007, Pinheiro et al., 2021; Pinheiro et al., 2022; Noël et al., 2021). During a penalty kick situation, the observable performance is rather the emergent result of the interaction process than the display of skills and abilities of the two parties (Lames, 2006; Lames & McGarry, 2007).

More recently, Pinheiro et al. (2021) designed and validated an observational system for penalty kicks analysis (OSPAF). The OSPAF, which contains the most relevant variables for penalty kick analysis validated by experts, has enabled the differentiation of the technical and tactical behavior of the goalkeeper and penalty taker. Based on the high methodological rigor of that study, it consolidates the OSPAF as an instrument that integrates the main variables for penalty analysis in top-level football (Pinheiro et al., 2022). Also, unprecedented evidence for standardization of viewing angles and video quality for observational analysis was suggested. Future research using the OSPAF is needed to identify penalty kick strategies and the relationship between the variables in the system itself (Pinheiro et al., 2021). Although the influence variables on penalty kicks success are extensively studied (Jamil et al., 2020; Memmert & Nöel, 2020; Paterson et al., 2020; Noël et al., 2021; Pinheiro et al., 2021) and research have partially described how goals in penalty kicks are scored in different European leagues (Li & Zao, 2021), to the best of our knowledge no investigation has focused on identifying observable variables related to the penalty taker strategy in the German Bundesliga. Therefore, the aims of this study in a reference to an elite professional football league were two-fold: i) to investigate which observable variables would be able to predict the penalty taker strategy, and ii) to identify the prevalence of the penalty taker strategy in the successful penalty kicks.

Methods

Sample

The dataset consists of 220 penalty kicks randomly selected from the German Bundesliga (seasons 2019 to 2021). The videos were recorded by TV broadcasters and were registered and analyzed post-event. As the video recordings were public, confidentiality was not an issue, and authorization was not required from the players observed or their representatives (Pinheiro et al., 2021). The procedures performed in the study were in strict accordance with the Declaration of Helsinki, as well as with the ethical standards of the Technical University of Munich.

Methodological Design

Video-based performance analysis of in-match penalty kicks in the German Bundesliga was performed using a previously developed and validated observational system (OSPAF) for penalty analysis in elite football (Pinheiro et al., 2021). The protocols for the use of observational systems were adopted (Aranda et al., 2019; Fernandes et al., 2019; Lames & Hansen, 2001), including the standardization of viewing angle and video quality (Pinheiro et al., 2021). All the observable behaviors recorded are described in Table 1.

Statistical Analysis

A descriptive analysis of the data was performed. Shapiro Wilk test was performed to verify data normality. The association level between the OSPAF variables with the penalty taker strategy was determined with the use of the chi-squared ($\chi 2$) test. The effect size was determined by using the Cramer's V and classified as weak ($ES \leq 0.2$), moderate ($0.2 < ES \leq 0.6$), and strong ($ES > 0.6$) (Cohen, 1988). These analyses were followed by a binary logistic regression (enter method) with the penalty taker strategy as the dependent variable and predictor variables as covariates. Odds ratio with 95% confidence interval were calculated. Kappa levels of the OSPAF were 0.90 and 0.86 - intra and inter reliability (Pinheiro et al., 2021). The interpretation of this coefficient was adopted as follows: $\kappa \geq 0.8$: very good; $0.6 < \kappa < 0.8$: good; $0.4 < \kappa < 0.6$: moderate; $0.2 < \kappa < 0.4$: fair; and $\kappa < 0.2$: poor (Altman, 1991; O'Donoghue, 2010). The p level considered was $p < 0.05$. All data were analyzed using JASP software (Team, 2020; JASP Version 0.14). Dimensions and categories of OSPAF were coded in Lince software (Gabin et al., 2012; Soto et al., 2019).

Table 1
OSPAF variables (adapted from Pinheiro et al., 2021).

Variables	Definition	Attribute Levels
Run up speed	Running speed of the penalty kicker towards the ball	Fast or Slow
Run up fluency	Characteristic of the penalty kicker's run during the approach of the ball, with or without pauses.	Continuous Running or Running with pauses
Run up approach angle	Penalty kicker's running angle to the ball.	Frontal or diagonal
Number of steps	Number of steps of the penalty kicker until contact with the ball	1-3; 3-5 or +5
Kicking technique	The technique used by the penalty kicker to kick the ball	Side foot kick or Instep kick
Perceived ball speed	How hard is the ball kicked?	Powerful shot or Placed shot
Foot used to kick	Foot used by the penalty kicker to kick the ball	Right or Left
Non-kicking foot orientation	Spatial orientation of the penalty kicker's support foot	Same orientation as the final direction of the kick; or Different orientation as the final direction of the kick
Penalty taker gaze behavior	Gaze behavior of the kicker during the approach run.	Gaze at the ball or Not at the ball
Goalkeeper (GK) initial posture	Position of the body segments.	Arms raised; Arms down or Arms extended in a position perpendicular to the goalkeeper 's trunk
Deception by the penalty taker	Indication if the kicker has done any action to distract the goalkeeper during his or her run-up	Yes or No
Anticipation movement of the goalkeeper at the ball contact point	Action is performed parallel to the kicker's kick action.	No Movement; Partial movement (at least 1 body segment moved); or Full movement (>1 body segment moved)
Goalkeeper tactical action	General evaluation of the way the goalkeeper acted during the penalty shoot-out, to the anticipatory aspect	Try to guess the location of the shot; or Awaiting the penalty taker action
Goalkeeper performance	Evaluation of the goalkeeper's performance according to his movement and contact with the ball	0: GK made any final movement to the side of the goal opposite to the final ball location; 1: GK did not move from the center of the goal; 2: GK made a movement in the correct direction but did not dive and failed to make contact with the ball; 3: GK dived in the correct direction but failed to make contact with the ball; 4: GK dived in the correct direction and contacted the ball without saving it; or 5: GK successfully saved the kick
Location of the match (kicker point of view)	Indication if the penalty kicker is from the home team, visitor, or if he plays on a neutral field.	Home, Neutral or Away
Momentary result (kicker point of view)	Result of the match (for the penalty kicker) at the moment the penalty was marked.	Winning, Drawing or Losing
Momentary result (GK point of view)	Result of the match (for the Goalkeeper) at the moment the penalty was marked.	Winning, Drawing or Losing
Match importance	Level of importance of the match for the team	Championship final match; Decisive knockout match; Group stage match; Early season game; Match in final stages of the season
Penalty kick direction	The direction of the ball on goal	Left, Center or Right
Penalty kick height	Height of the ball on goal	Upper, Center or Down
Penalty kick outcome	Result of the penalty kick	Goal, Saved by goalkeeper or Shot misses goal (wide, over or post)
Penalty taker strategy	Overall strategy perceived by the observer (Kuhn, 1988)	Goalkeeper Dependent; Unclear or Goalkeeper independent
Goalkeeper strategy	Overall strategy perceived by the observer (Kuhn, 1988)	Kicker Independent; Unclear or Kicker dependent

Results

The 220 penalty kicks from the German Bundesliga (seasons 2019 to 2021) analyzed had a total of 174 goals (79.09% successful rate), 36 saved by goalkeepers (16.36%) and 10 shots away from goal 4.55%). The general descriptive statistics are presented in the supplementary Table 2 and Table 3 (See the Appendixes).

The association between all the OSPAF variables with the penalty taker's strategy was analyzed. For informative purposes, Table 4 presents the variables with no association with the penalty taker strategy. Table 5 presents only the variables with association and the respective effect sizes.

A logistic regression (enter method) was performed to investigate the relationship between the observable behaviors registered via OSPAF on the likelihood of the penalty taker strategy. The logistic regression model was statistically significant, $\chi 2$ (177) = 211.049, $p < .001$. The model correctly classified 96% of cases. The following behavior: gaze behavior at the ball, no deception, number of steps more than 3, perceived ball speed as powerful shot, run up speed fast, penalty kick shot height at the center or down, kicking technique instep kick, and run up approach frontal was related to the goalkeeper independent strategy. In successful penalty kicks (i.e., goal) the independent goalkeeper strategy was more adopted (59.87%).

Discussion

The present study aimed to investigate which observable variables would be able to predict the penalty taker strategy; and to identify the prevalence of the penalty taker strategy in the successful penalty kicks. The main findings indicated that the penalty taker strategy, called goalkeeper-independent, is related to the following behavior: gaze behavior at the ball, no deception, number of steps more than 3, perceived ball speed as powerful shot, run up speed fast, penalty kick shot height at the center or down, kicking technique instep kick, and run up approach frontal. It was also found that the goalkeeper independent strategy was more adopted in the successful penalty kicks.

Table 4

OSPAF variables with no association with the penalty taker strategy.

OSPAF Variables	p
Foot used to kick	0.228
Goalkeeper (GK) initial posture	0.216
Anticipation movement of the GK at the ball contact point	0.752
GK tactical action	0.696
GK performance	0.215
Location of the match (kicker point of view)	0.244
Momentary result (GK point of view)	0.673
Match importance	0.750
Penalty kick direction	0.685
Penalty kick outcome	0.667
Goalkeeper strategy	0.513

Table 5

Association between OSPAF variables with the penalty taker strategy.

	OSPAF Variables	$\chi 2$	p	Cramer´s V
Penalty Taker Strategy	Run Up Speed	14.289	< 0.05	0.267
	Run Up Fluency	71.843	< 0.05	0.601
	Run Up Approach Angle	3.965	< 0.05	0.141
	Number of Steps	39.876	< 0.05	0.448
	Kicking Technique	4.188	< 0.05	0.145
	Perceived Ball Speed	24.014	< 0.05	0.347
	Non-kicking foot orientation	6.182	< 0.05	0.186
	Gaze behavior	153.922	< 0.05	0.882
	Deception	99.349	< 0.05	0.707
	Penalty kick shot height	10.042	< 0.05	0.224

The results of the present study support the findings from Nöel et al. (2015), whose indicated that attention to the goalkeeper, run-up fluency, and kicking technique could predict the penalty-taker strategy. However, the present findings indicate a prediction of strategy with greater assertiveness (96%) and based on observable variables that provide more comprehensive information on the behavior of the penalty taker. Corroborating with previous studies (Li et al., 2015; Kuhn, 1988; Nöel et al., 2015), the observable variables based on the OSPAF selection, such as the run-up profile, including the number of steps, speed and approach angle may serve to differentiate the strategies.

A penalty taker can attempt to intentionally vary or disguise their kicking action in order to make visual anticipation more difficult for the goalkeeper (Dicks et al., 2011). In the current study, the goalkeeper independent strategy was related to a non-deceptive behavior. This can be explained by the fact that in this strategy, the kicker already has a pre-determined plan of where he will shoot (Kuhn, 1988). By choosing goal side before the run-up, the keeper-independent strategy minimizes the risk for running out of time when adjusting kick direction to the goalkeepers' actions as per keeper-dependent strategy (van der Kamp, 2006). Additionally, gaze during the keeper-independent strategy is more often directed at the target and the ball (rather than the goalkeeper), allowing for a more accurate kick (Hüttermann et al., 2014).

Besides of that, the player's gaze behavior towards the ball, found in the present study, corroborate previous research (Nöel et al., 2015). Van der Kamp (2006) also put forward that the two strategies may invoque distinct patterns of gaze that directly influence the success of penalty kicks. Penalty takers who use a keeper-dependent strategy spend more time looking at the goalkeeper throughout the run-up and kick execution (to anticipate or respond to the goalkeeper moves) than penalty takers who use a keeper-independent strategy (Noël & van der Kamp, 2012). Gaze patterns may also mediate the negative effects of anxiety on penalty kick success rate. Such psychological factor may influence the performance of the player in such decisive moment. The attentional control theory (Eysenck et al., 2007; Oudejans & Nieuwenhuys, 2009) helps to better understand the relationship between anxiety and performance. Moreira et al. (2021) compared the attention performance, by playing position, in elite football players. It was found that defenders were the players who maintained the attention level for more time, while the fullbacks maintained for less time. Players in offensive playing positions (fullbacks and attacking midfielders) maintained their impulsive behavior for longer when compared to defensive positions (defenders and defensive midfielders). Nevertheless, it is well-known that there are multiple criteria for a coach to define a team's penalty takers (e.g., technical skills). Empirically, it has not been observed coaches taking into consideration the players' attentional levels per position to define their penalty takers. For instance, this sort of analyses could provide future insights for coaches when choosing penalty takers.

Kuhn (1988) indicated that ball speed could also distinguish strategies. In the present study, the perceived ball speed as powerful shot was related to the goalkeeper independent strategy. Corroborating this finding, previous research indicated that high ball-speed and accurate cunning direction provide little chance for goalkeepers to save penalty kicks (Li et al., 2015). The kicking technique is related to the ball speed, supporting our findings on the vast use of the instep kick in the goalkeeper independent strategy.

Prior investigation revealed that kick direction significantly impacts penalty success, to varying extents, in all different elite leagues (Jamil et al., 2020). In an analysis independent of the strategy adopted, Jamil et al. (2020) found that penalty takers in the German Bundesliga preferred an approach of targeting the bottom corners of the goal with little elevation (less than 0.81 meters). Even though research has shown that the probability of scoring is significantly higher when targeting the upper areas of the goal (Almeida et al., 2016; Bar-Eli & Azar, 2009), the present findings corroborate with Jamil et al. (2020), indicating that the kickers with goalkeeper independent strategy have directed the ball in a center or down area of the goal. Bar-Eli & Azar (2009) stated that players may tend to prefer the more risk averse options due to the fear of failure and the apprehension of being perceived as unskilled should they miss the target, which could explain these results.

Interestingly, the following variables showed no association with the strategy of the penalty taker: foot used to kick ($p = 0.228$), GK initial posture ($p = 0.216$), Anticipation movement of the GK at the ball contact point ($p = 0.752$), GK tactical action ($p = 0.696$), GK performance ($p = 0.215$), location of the match (kicker point of view) ($p = 0.244$), momentary result of the match (GK point of view) ($p = 0.673$), match

importance (p = 0.750), penalty kick direction (p = 0.685), penalty kick outcome (p = 0.667), and goalkeeper strategy (p = 0.513). Identifying which variables are unrelated to the penalty taker's strategy provides practical and scientific insights for strategy and outcome analysis. Past research has shown that footedness did not predict the penalty outcome (Almeida et al., 2016), and based on the present findings, footedness has no association with the penalty taker strategy. Other kinematic parameters (i.e., non-kicking foot and hips orientation, approach angle) are more related to the strategy identification (Pinheiro et al., 2022) and could predict kick directions (Li et al., 2015).

Although recent studies indicate that there is an interactive relationship between the penalty taker and the goalkeeper (Lames & McGarry, 2007; Pinheiro et al., 2021; Pinheiro et al., 2022; Noël et al., 2021), in the present study no associations were found between the goalkeeper initial posture, performance, anticipation and tactical action, with the penalty taker strategy. On the other hand, the interaction between penalty taker and goalkeeper is seem when analyzing the goalkeeper strategy. Research has indicated that the goalkeeper strategy is influenced by the penalty taker run-up pattern, for example (Pinheiro et al., 2022). Perhaps the present finding can be explained by the fact that the present study had a limitation of not having applied time intervals before the kick, exact moment of the kick or an event (i.e., start of the penalty kicker's run). The temporal aspect influences goalkeepers who choose when to initiate the jump to the ball during the run-up (i.e., jump early or wait too long), and penalty takers who decide where to kick the ball, either before the run-up or after the goalkeeper has committed to one side. (Nöel et al., 2021).

Research has indicated that the prevalence of penalty kick strategies can also be mediated by situational factors, such as the match location and importance or the momentary result (Pinheiro et al., 2021; Nöel et al., 2015). However, the present findings of the German Bundesliga indicating that none of these factors influenced the penalty taker strategy. Previous research also indicated that individual factors also did not influence the penalty outcome (Almeida et al., 2016). This may indicate that coping with stress in high-pressure contexts may be a crucial aspect of avoiding suboptimal penalty shootout performance in major competitions.

Surprisingly, the penalty kick outcome presented no association with the penalty taker strategy. A drawback of this result is that the dynamics of taking a successful penalty may vary from player to player, due to skill level, tactics, physical factors, the quality of coaching of the players, as well as historical, social, and cultural aspects (Jamil et al., 2020). Jamil et al. (2020) showed that penalty takers in the German Bundesliga appeared to be more unpredictable, which may also explain the present findings. Again, here it is important to note the limitation of the study of not having applied time intervals before the kick, exact moment of the kick or an event (i.e., start of the penalty kicker's run), which may influence this result. Besides of that, a limitation of that analysis is that the construct "penalty taker's strategy" was analyzed as a variable. However, this variable can be analyzed subjectively by the observer, and might be perceived differently between observers.

The main limitation of the present study is to analyze only one football league. Therefore, caution is needed when analyzing the data, especially when generalizing the results to other leagues. Regardless, the findings from the current study have implications for performance analysts and/or coaches who seek to identify penalty takers' likely strategies in the German Bundesliga. The current results may support teams in the preparation against a future opponent and the optimization of training. Through analysis of the kicker's running pattern (e.g., speed, number of steps, approach angle), deception actions, gaze behavior, and kicking technique, one may attempt to determine the kicker's favored approach, and ultimately the penalty kick strategy.

Conclusions

Results of the present study indicated that is possible to correctly predict the penalty taker strategy called goalkeeper-independent in 96% of cases. Through analysis of the observable variables of OSPAF, it can be observed that in the Bundesliga the following behavior: gaze behavior at the ball, no deception, number of steps more than 3, perceived ball speed as powerful shot, run up speed fast, penalty kick shot height at the center or down, kicking technique instep kick, and run up approach frontal, is related to the goalkeeper independent strategy. The findings suggest that the keeper-independent strategy is prevalent in successful penalty kicks in the German Bundesliga. For coaches, it is essential to incorporate drills that emphasize the development of a fast and powerful shot, as well as training players to maintain focus on the ball and avoid

deceptive behaviors during penalty kicks to increase the likelihood of success. Encouraging players to use a frontal run-up approach with more than three steps in their run-up aligns with the observed successful behaviors. Specifically for goalkeeper coaches, it is crucial to educate goalkeepers to recognize the goalkeeper-independent strategy through specific cues such as the kicker's gaze behavior, run-up speed, and approach. Developing drills that enhance the goalkeeper's ability to react quickly to powerful shots directed at the center or lower parts of the goal is also important. Continuous analysis and review of penalty kicks from matches can help identify any emerging trends or changes in the penalty taker's strategies, ensuring goalkeepers are well-prepared. By integrating these recommendations into training programs, coaches can better prepare both penalty takers and goalkeepers, potentially improving their performance and success rates during critical moments in matches.

Author Contributions

All authors contributed to the writing and revision of the manuscript and read and approved the submitted version.

Ethical Approval

This study does not require ethics committee approval.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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APPENDIXES

Table 2
Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for Run up Speed

PK Outcome	Run up Speed	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Slow	131	75.287	75.287	75.287
	Fast	43	24.713	24.713	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot Misses Goal	Slow	8	80.000	80.000	80.000
	Fast	2	20.000	20.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Slow	24	66.667	66.667	66.667
	Fast	12	33.333	33.333	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Run up Fluency

PK Outcome	Run up Fluency	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Continuous running	110	63.218	63.584	63.584
	Running with pauses	63	36.207	36.416	100.000
	Missing	1	0.575		
	Total	174	100.000		
Shot misses goal	Continuous running	7	70.000	70.000	70.000
	Running with pauses	3	30.000	30.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Continuous running	26	72.222	72.222	72.222
	Running with pauses	10	27.778	27.778	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Run up approach angle

PK Outcome	Run up approach angle	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Diagonal	94	54.023	54.023	54.023
	Frontal	80	45.977	45.977	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Diagonal	2	20.000	20.000	20.000
	Frontal	8	80.000	80.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Diagonal	22	61.111	61.111	61.111
	Frontal	14	38.889	38.889	100.000
	Missing	0	0.000		
	Total	36	100.000		

Table 2 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for Number of steps

PK Outcome	Number of steps	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	1 to 3 steps	85	48.851	49.133	49.133
	4 to 5 steps	77	44.253	44.509	93.642
	More than 5 steps	11	6.322	6.358	100.000
	Missing	1	0.575		
	Total	174	100.000		
Shot misses goal	1 to 3 steps	7	70.000	70.000	70.000
	4 to 5 steps	3	30.000	30.000	100.000
	More than 5 steps	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	1 to 3 steps	18	50.000	50.000	50.000
	4 to 5 steps	12	33.333	33.333	83.333
	More than 5 steps	6	16.667	16.667	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Kicking technique

PK Outcome	Kicking technique	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Side foot	163	93.678	93.678	93.678
	Instep kick	11	6.322	6.322	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Side foot	8	80.000	80.000	80.000
	Instep kick	2	20.000	20.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Side foot	33	91.667	91.667	91.667
	Instep kick	3	8.333	8.333	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for perceived ball speed

PK Outcome	Perceived ball speed	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Placed shot	140	80.460	80.460	80.460
	Powerful shot	34	19.540	19.540	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Placed shot	8	80.000	80.000	80.000
	Powerful shot	2	20.000	20.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Placed shot	30	83.333	83.333	83.333
	Powerful shot	6	16.667	16.667	100.000
	Missing	0	0.000		
	Total	36	100.000		

Table 2 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for Foot used to kick

PK Outcome	Foot used to kick	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Right	130	74.713	74.713	74.713
	Left	44	25.287	25.287	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Right	8	80.000	80.000	80.000
	Left	2	20.000	20.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Right	27	75.000	75.000	75.000
	Left	9	25.000	25.000	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Non-kicking foot orientation

PK Outcome	Non-kicking foot orientation	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Same orientation	98	56.322	66.667	66.667
	Different orientation	49	28.161	33.333	100.000
	Missing	27	15.517		
	Total	174	100.000		
Shot misses goal	Same orientation	7	70.000	77.778	77.778
	Different orientation	2	20.000	22.222	100.000
	Missing	1	10.000		
	Total	10	100.000		
Saved	Same orientation	25	69.444	78.125	78.125
	Different orientation	7	19.444	21.875	100.000
	Missing	4	11.111		
	Total	36	100.000		

Frequencies for Penalty taker gaze behavior

PK Outcome	Penalty taker gaze behavior	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Not at the ball	70	40.230	41.176	41.176
	At the ball	100	57.471	58.824	100.000
	Missing	4	2.299		
	Total	174	100.000		
Shot misses goal	Not at the ball	2	20.000	20.000	20.000
	At the ball	8	80.000	80.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Not at the ball	10	27.778	27.778	27.778
	At the ball	26	72.222	72.222	100.000
	Missing	0	0.000		
	Total	36	100.000		

Table 2 - Continued

Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for Goalkeeper initial posture

PK Outcome	GK initial posture	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Arms down	118	67.816	68.605	68.605
	Arms raised	25	14.368	14.535	83.140
	Arms extended	29	16.667	16.860	100.000
	Missing	2	1.149		
	Total	174	100.000		
Shot misses goal	Arms down	4	40.000	40.000	40.000
	Arms raised	3	30.000	30.000	70.000
	Arms extended	3	30.000	30.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Arms down	20	55.556	57.143	57.143
	Arms raised	8	22.222	22.857	80.000
	Arms extended	7	19.444	20.000	100.000
	Missing	1	2.778		
	Total	36	100.000		

Frequencies for Deception by Penalty taker

PK Outcome	Deception by PK	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Yes	47	27.011	27.168	27.168
	No	126	72.414	72.832	100.000
	Missing	1	0.575		
	Total	174	100.000		
Shot misses goal	Yes	3	30.000	30.000	30.000
	No	7	70.000	70.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Yes	8	22.222	22.222	22.222
	No	28	77.778	77.778	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Anticipation Goalkeeper

PK Outcome	Anticipation GK	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Full body movement	52	29.885	29.885	29.885
	Partial body movement	86	49.425	49.425	79.310
	No movement	36	20.690	20.690	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Full body movement	6	60.000	60.000	60.000
	Partial body movement	3	30.000	30.000	90.000
	No movement	1	10.000	10.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Full body movement	11	30.556	31.429	31.429
	Partial body movement	19	52.778	54.286	85.714
	No movement	5	13.889	14.286	100.000
	Missing	1	2.778		
	Total	36	100.000		

Table 2 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for Goalkeeper Tactical Action

PK Outcome	GK Tactical Action	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Try to guess	68	39.080	39.766	39.766
	Awaiting	103	59.195	60.234	100.000
	Missing	3	1.724		
	Total	174	100.000		
Shot misses goal	Try to guess	6	60.000	60.000	60.000
	Awaiting	4	40.000	40.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Try to guess	9	25.000	25.714	25.714
	Awaiting	26	72.222	74.286	100.000
	Missing	1	2.778		
	Total	36	100.000		

Frequencies for Goalkeeper Performance

PK Outcome	GK Performance	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	0	112	64.368	64.368	64.368
	1	1	0.575	0.575	64.943
	3	49	28.161	28.161	93.103
	4	12	6.897	6.897	100.000
	5	0	0.000	0.000	100.000
	6	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	0	6	60.000	60.000	60.000
	1	0	0.000	0.000	60.000
	3	4	40.000	40.000	100.000
	4	0	0.000	0.000	100.000
	5	0	0.000	0.000	100.000
	6	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	0	0	0.000	0.000	0.000
	1	0	0.000	0.000	0.000
	3	0	0.000	0.000	0.000
	4	0	0.000	0.000	0.000
	5	35	97.222	97.222	97.222
	6	1	2.778	2.778	100.000
	Missing	0	0.000		
	Total	36	100.000		

Table 2 - Continued

Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for moment of the match

PK Outcome	Moment of the match	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	First half	72	41.379	41.379	41.379
	Second half	102	58.621	58.621	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	First half	2	20.000	20.000	20.000
	Second half	8	80.000	80.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	First half	17	47.222	47.222	47.222
	Second half	19	52.778	52.778	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Location of the match (kicker point of view)

PK Outcome	Location of the match	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Home	96	55.172	55.172	55.172
	Away	78	44.828	44.828	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Home	8	80.000	80.000	80.000
	Away	2	20.000	20.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Home	15	41.667	41.667	41.667
	Away	21	58.333	58.333	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Momentary result (Goalkeeper point of view)

PK Outcome	Momentary result	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Winning	53	30.460	30.460	30.460
	Losing	44	25.287	25.287	55.747
	Drawing	77	44.253	44.253	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Winning	4	40.000	40.000	40.000
	Losing	4	40.000	40.000	80.000
	Drawing	2	20.000	20.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Winning	4	11.111	11.111	11.111
	Losing	17	47.222	47.222	58.333
	Drawing	15	41.667	41.667	100.000
	Missing	0	0.000		
	Total	36	100.000		

Table 2 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for Match Importance

PK Outcome	Match Importance	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Early season	115	66.092	66.092	66.092
	Final season	59	33.908	33.908	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Early season	6	60.000	60.000	60.000
	Final season	4	40.000	40.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Early season	24	66.667	66.667	66.667
	Final season	12	33.333	33.333	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Penalty taker direction

PK Outcome	PK direction	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Right	68	39.080	39.080	39.080
	Left	85	48.851	48.851	87.931
	Center	21	12.069	12.069	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Right	0	0.000	0.000	0.000
	Left	7	70.000	70.000	70.000
	Center	3	30.000	30.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Right	19	52.778	52.778	52.778
	Left	15	41.667	41.667	94.444
	Center	2	5.556	5.556	100.000
	Missing	0	0.000		
	Total	36	100.000		

Frequencies for Penalty taker Height

PK Outcome	PK Height	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Upper	19	10.920	10.920	10.920
	Center	38	21.839	21.839	32.759
	Down	117	67.241	67.241	100.000
	Missing	0	0.000		
	Total	174	100.000		
Shot misses goal	Upper	4	40.000	40.000	40.000
	Center	0	0.000	0.000	40.000
	Down	6	60.000	60.000	100.000
	Missing	0	0.000		
	Total	10	100.000		
Saved	Upper	0	0.000	0.000	0.000
	Center	8	22.222	22.222	22.222
	Down	28	77.778	77.778	100.000
	Missing	0	0.000		
	Total	36	100.000		

Table 2 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick outcome.

Frequencies for Penalty taker Strategy

PK Outcome	PK Strategy	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	GK dependent	63	36.207	40.127	40.127
	GK independent	94	54.023	59.873	100.000
	Missing	17	9.770		
	Total	174	100.000		
Shot misses goal	GK dependent	3	30.000	33.333	33.333
	GK independent	6	60.000	66.667	100.000
	Missing	1	10.000		
	Total	10	100.000		
Saved	GK dependent	10	27.778	29.412	29.412
	GK independent	24	66.667	70.588	100.000
	Missing	2	5.556		
	Total	36	100.000		

Frequencies for Goalkeeper Strategy

PK Outcome	GK Strategy	Frequency	Percent	Valid Percent	Cumulative Percent
Goal	Kicker dependent	62	35.632	52.101	52.101
	Kicker independent	57	32.759	47.899	100.000
	Missing	55	31.609		
	Total	174	100.000		
Shot misses goal	Kicker dependent	0	0.000	0.000	0.000
	Kicker independent	6	60.000	100.000	100.000
	Missing	4	40.000		
	Total	10	100.000		
Saved	Kicker dependent	23	63.889	79.310	79.310
	Kicker independent	6	16.667	20.690	100.000
	Missing	7	19.444		
	Total	36	100.000		

Table 3
Frequency distribution of the observable behaviors in relation to the penalty kick strategy.

Frequencies for Run up Speed

PK Strategy	Run up Speed	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Slow	67	88.158	88.158	88.158
	Fast	9	11.842	11.842	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Slow	79	63.710	63.710	63.710
	Fast	45	36.290	36.290	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Run up Fluency

PK Strategy	Run up Fluency	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Continuous running	22	28.947	28.947	28.947
	Running with pauses	54	71.053	71.053	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Continuous running	108	87.097	87.805	87.805
	Running with pauses	15	12.097	12.195	100.000
	Missing	1	0.806		
	Total	124	100.000		

Frequencies for Run up approach angle

PK Strategy	Run up approach angle	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Diagonal	35	46.053	46.053	46.053
	Frontal	41	53.947	53.947	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Diagonal	75	60.484	60.484	60.484
	Frontal	49	39.516	39.516	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Number of steps

PK Strategy	Number of steps	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	1 to 3 steps	22	28.947	28.947	28.947
	4 to 5 steps	53	69.737	69.737	98.684
	More than 5 steps	1	1.316	1.316	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	1 to 3 steps	76	61.290	61.789	61.789
	4 to 5 steps	31	25.000	25.203	86.992
	More than 5 steps	16	12.903	13.008	100.000
	Missing	1	0.806		
	Total	124	100.000		

Table 3 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick strategy.

Frequencies for Kicking technique

PK Strategy	Kicking technique	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Side foot	74	97.368	97.368	97.368
	Instep kick	2	2.632	2.632	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Side foot	111	89.516	89.516	89.516
	Instep kick	13	10.484	10.484	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for perceived ball speed

PK Strategy	Perceived ball speed	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Placed shot	74	97.368	97.368	97.368
	Powerful shot	2	2.632	2.632	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Placed shot	85	68.548	68.548	68.548
	Powerful shot	39	31.452	31.452	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Foot used to kick

PK Strategy	Foot used to kick	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Right	53	69.737	69.737	69.737
	Left	23	30.263	30.263	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Right	98	79.032	79.032	79.032
	Left	26	20.968	20.968	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Non-kicking foot orientation

PK Strategy	Non-kicking foot orientation	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Same orientation	50	65.789	75.758	75.758
	Different orientation	16	21.053	24.242	100.000
	Missing	10	13.158		
	Total	76	100.000		
GK independent	Same orientation	73	58.871	69.524	69.524
	Different orientation	32	25.806	30.476	100.000
	Missing	19	15.323		
	Total	124	100.000		

Frequencies for Penalty taker gaze behavior

PK Strategy	Penalty taker gaze behavior	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Not at the ball	69	90.789	92.000	92.000
	At the ball	6	7.895	8.000	100.000
	Missing	1	1.316		
	Total	76	100.000		
GK independent	Not at the ball	5	4.032	4.065	4.065
	At the ball	118	95.161	95.935	100.000
	Missing	1	0.806		
	Total	124	100.000		

Table 3 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick strategy.

Frequencies for Goalkeeper initial posture

PK Strategy	GK initial posture	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Arms down	57	75.000	75.000	75.000
	Arms raised	9	11.842	11.842	86.842
	Arms extended	10	13.158	13.158	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Arms down	71	57.258	58.678	58.678
	Arms raised	25	20.161	20.661	79.339
	Arms extended	25	20.161	20.661	100.000
	Missing	3	2.419		
	Total	124	100.000		

Frequencies for Deception by Penalty taker

PK Strategy	Deception by PK	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Yes	51	67.105	67.105	67.105
	No	25	32.895	32.895	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Yes	3	2.419	2.439	2.439
	No	120	96.774	97.561	100.000
	Missing	1	0.806		
	Total	124	100.000		

Frequencies for Anticipation Goalkeeper

PK Strategy	Anticipation GK	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Full body movement	20	26.316	26.316	26.316
	Partial body movement	40	52.632	52.632	78.947
	No movement	16	21.053	21.053	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Full body movement	42	33.871	34.146	34.146
	Partial body movement	59	47.581	47.967	82.114
	No movement	22	17.742	17.886	100.000
	Missing	1	0.806		
	Total	124	100.000		

Frequencies for Goalkeeper Tactical Action

PK Strategy	GK Tactical Action	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Try to guess	27	35.526	36.000	36.000
	Awaiting	48	63.158	64.000	100.000
	Missing	1	1.316		
	Total	76	100.000		
GK independent	Try to guess	49	39.516	40.496	40.496
	Awaiting	72	58.065	59.504	100.000
	Missing	3	2.419		
	Total	124	100.000		

Table 3 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick strategy.

Frequencies for Goalkeeper Performance

PK Strategy	GK Performance	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	0	51	67.105	67.105	67.105
	1	0	0.000	0.000	67.105
	3	12	15.789	15.789	82.895
	4	3	3.947	3.947	86.842
	5	10	13.158	13.158	100.000
	6	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	0	53	42.742	42.742	42.742
	1	1	0.806	0.806	43.548
	3	38	30.645	30.645	74.194
	4	8	6.452	6.452	80.645
	5	23	18.548	18.548	99.194
	6	1	0.806	0.806	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for moment of the match

PK Strategy	Moment of the match	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	First half	35	46.053	46.053	46.053
	Second half	41	53.947	53.947	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	First half	49	39.516	39.516	39.516
	Second half	75	60.484	60.484	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Location of the match (kicker point of view)

PK Strategy	Location of the match	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Home	41	53.947	53.947	53.947
	Away	35	46.053	46.053	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Home	66	53.226	53.226	53.226
	Away	58	46.774	46.774	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Momentary result (Goalkeeper point of view)

PK Strategy	Momentary result	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Winning	24	31.579	31.579	31.579
	Losing	19	25.000	25.000	56.579
	Drawing	33	43.421	43.421	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Winning	31	25.000	25.000	25.000
	Losing	40	32.258	32.258	57.258
	Drawing	53	42.742	42.742	100.000
	Missing	0	0.000		
	Total	124	100.000		

Table 3 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick strategy.

Frequencies for Match Importance

PK Strategy	Match Importance	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Early season	51	67.105	67.105	67.105
	Final season	25	32.895	32.895	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Early season	82	66.129	66.129	66.129
	Final season	42	33.871	33.871	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Penalty kick direction

PK Strategy	PK direction	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Right	32	42.105	42.105	42.105
	Left	35	46.053	46.053	88.158
	Center	9	11.842	11.842	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Right	48	38.710	38.710	38.710
	Left	63	50.806	50.806	89.516
	Center	13	10.484	10.484	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Penalty kick Height

PK Strategy	PK Height	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Upper	4	5.263	5.263	5.263
	Center	11	14.474	14.474	19.737
	Down	61	80.263	80.263	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Upper	18	14.516	14.516	14.516
	Center	33	26.613	26.613	41.129
	Down	73	58.871	58.871	100.000
	Missing	0	0.000		
	Total	124	100.000		

Frequencies for Goalkeeper Strategy

PK Strategy	GK Strategy	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Kicker dependent	31	40.789	60.784	60.784
	Kicker independent	20	26.316	39.216	100.000
	Missing	25	32.895		
	Total	76	100.000		
GK independent	Kicker dependent	46	37.097	51.111	51.111
	Kicker independent	44	35.484	48.889	100.000
	Missing	34	27.419		
	Total	124	100.000		

Table 3 - Continued
Frequency distribution of the observable behaviors in relation to the penalty kick strategy.

Frequencies for Penalty kick Outcome

PK Strategy	PK Outcome	Frequency	Percent	Valid Percent	Cumulative Percent
GK dependent	Goal	63	82.895	82.895	82.895
	Shot misses goal	3	3.947	3.947	86.842
	Saved	10	13.158	13.158	100.000
	Missing	0	0.000		
	Total	76	100.000		
GK independent	Goal	94	75.806	75.806	75.806
	Shot misses goal	6	4.839	4.839	80.645
	Saved	24	19.355	19.355	100.000
	Missing	0	0.000		
	Total	124	100.000		

PK = Penalty kick, PT = Penalty taker, GK = Goalkeeper