Effects of Actions Preceding the Jump Shot on Gaze Behavior and Shooting Performance in Elite Female Basketball Players

by

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Reprinted from


Volume 7 · Number 2 · 2012
The aim was to investigate the effects of different actions preceding the jump shot on basketball shooting in expert female basketball players. Participants took two-point jump shots after a dribble or after receiving a pass. The dribble was executed with the dominant or non-dominant hand. Similarly, the pass was received from the side of the dominant or non-dominant hand. Shooting percentages were higher after a pass than after a dribble, and after a dominant-side than after a non-dominant-side pre-action. Higher percentages were accompanied by longer execution times of actions preceding the shot. Furthermore, it appeared that in all conditions players looked at the rim sufficiently long for accurate shooting. We conclude that actions preceding the jump-shot affect shooting percentages. Effects are related to execution time of actions prior to the shot, possibly in combination with the biomechanical consequences of performing these actions on the dominant or non-dominant side.

Key words: Gaze Behavior, Jump Shot, Laterality, Shooting Accuracy, Women’s Basketball

INTRODUCTION
In basketball, the technique that is used most often to score is the jump shot. Statistics of the 2010 season of the Women’s National Basketball Association (WNBA) indicate that of all shots 34% were close range shots within 2 m (including lay-ups, dunks and hook shots) while 66% of all field goal attempts were jump shots from more than 2 m from the rim (wnba.com [1]). Furthermore, investigations of game related statistics from expert basketball games revealed that especially successful field goals (along with free throw percentages, defensive rebounds, and assists) correlated with the win-loss record of basketball teams during World Championships and other expert basketball competitions [2-7]. That over 60% of the field
goals are jumps shots from further away reveals the importance of jump shots in basketball.

Various aspects concerning the jump shot have been investigated in previous studies, such as the effects of shooting distance on ball release height, release angle and release speed [8-10], the consequences of fatigue on joint angles and ball flight [11], the consequences of an opponent on joint angles and ball flight [12], and visual control [13-19]. All of these studies primarily focused on the final shooting phase of the jump shot. Possible effects of actions preceding the jump shot on shooting percentages were not investigated. Although actions preceding the jump shot were standardized, there were large differences among studies. For instance, participants shot after taking a step and a dribble [9, 13,14,16,17] or after receiving a pass [11,12,18].

National Basketball Association (NBA) statistics suggest that shooting percentages can differ depending on the actions prior to the jump shot. Average shooting percentages of the 2004-2005 season of the NBA’s Sacramento Kings differed 5% between shooting after receiving a pass (41%) compared to shooting after a dribble (36%; www.82games.com [20]). Furthermore, analyses of game statistics from teams in the NBA and WNBA revealed that the number of assisted shots (i.e., after a pass) correlated with the win-loss record [21-23]. Moreover, in the WNBA, of all field goals made, 60% is assisted [1]. These statistics suggest that shooting after a pass may provide a more powerful scoring tool than shooting after a dribble [22,23]. However, this has never been investigated in an empirical study in which actions preceding the jump shot were systematically manipulated. On the basis of the statistics from the NBA and WNBA it is not possible to rule out that other factors, such as fatigue, opponents [11,12] or shooting distance, may have caused the differences between shooting percentages of shots after a dribble or a pass. Some of the above statistics remain mute as to the differences in distance of the assisted or unassisted shots. Perhaps a larger proportion of assisted shots was from close range (including layups and dunks) compared to unassisted shots (or vice versa). In the current study, we determined whether shooting after a dribble or after a pass affects jump-shot percentages of expert female basketball players. If systematic differences exist, this may have consequences for basketball tactics and training methods.

How accurate players shoot after a dribble or a pass may also be dependent on the hand with which they dribble and the side from which they receive the pass. If a right-handed player dribbles with the right hand or receives the pass from the right side prior to a shot, orientation towards the basket and alignment of the shooting side and arm may be different than when the player dribbles with left or receives the pass from the left. In case of a right-handed dribble or a pass from the right, the ball is already at the shooting side of the body. In case of a left-handed dribble or a pass from the left, the ball first has to be moved from the left side to the right side of the body before the shot can be executed. Because side of the preceding action may be an important factor in shooting, we included this as a factor in the experiment.

In short, we investigated the effects of type (dribble or pass) and side (dominant or non-dominant) of actions preceding the jump shot on basketball shooting in expert female basketball players. Next to shooting percentages we also measured task duration, and gaze behavior to determine whether possible differences in performance would be related to speed of task execution or differences in visual control, the latter of which has been established as crucial for basketball shooting performance [13,14,15,17,19,24]. On the basis of NBA and

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1 www.82games.com objectively provides unique NBA statistics. Executed notational analyses are presented on the website with clear explanations of terms and numbers.
WNBA statistics, it was expected that shooting after a pass would lead to better performance than shooting after a dribble. Furthermore, it was expected that after a dominant-hand dribble or receiving a pass on the dominant side, shooting performance would be better than following an action from the non-dominant side, as it was assumed that these shots would have biomechanical benefits. Given the exploratory nature of this study, we did not have a priori predictions for duration of task execution and visual control, other than that it was logically expected that players would have to look at the ball while receiving a pass while this was not the case during a dribble.

**METHOD**

**PARTICIPANTS**

Eleven right-handed female basketball players with a mean age of 19.1 years ($SD = 1.3$), participated in the experiment. They had a mean basketball experience of 11.4 years ($SD = 2.2$). They all trained at a national basketball talent center in which the participants trained for 20 hours a week under leadership of several certified coaches. All participants played in the highest division for women basketball in The Netherlands and all were member of one of the National teams (seniors, U20, or U18). Two participants had corrected vision (contact lenses), which did not affect the measurements. Permission to execute this study was granted by the institutional ethics committee and each participant provided informed consent before participating in the experiment.

**EXPERIMENTAL SETUP**

A standard basketball backboard and rim (height 3.05 m) was placed in a gym-sized experimental room (height 7.5 m). The balls used were official regulation FIBA women basketballs (size 6). There were two shooting positions at a distance of approximately 5 meters from the rim (see Figure 1), leading to regular 2-point jump shots from a mid-range distance. Taking shots from further away may be more dependent on additional force development [8,9]. Two squares of 0.5-by-0.5 meter were taped on the floor to indicate both shooting positions. The initial starting positions were approximately 2 meters diagonally behind the shooting positions. Furthermore, there were two contralateral passing positions placed next to the shooting positions at a distance of 2 meters (see Figure 1; [12]).

A digital video (DV) camera (29.97 Hz) was placed next to the basket at a distance of 3 meters to the left to capture all the actions of the participants. The recordings of the DV camera were used to determine the duration of the pre-shot phase and shot phase. The pre-shot phase lasted from the first visible forward movement from the starting position until the moment at which the player had the ball in two hands after finishing the dribble or receiving the pass. The shot phase lasted from this last moment of the pre-shot phase (having the ball in two hands) until ball release (cf. [12]).

Gaze behavior was registered using the Mobile Eye (Applied Science Laboratory, Bedford, USA). The Mobile Eye is a monocular system that exists of a pair of glasses to which an infrared eye camera and a scene camera are attached (both 29.97 Hz). After calibrating the Mobile Eye on a 9-point-grid, the eye camera is able to correctly measure the displacement between the center of the pupil and cornea reflex and determine the eye line of gaze within a visual angle error of ±1°. Thereafter, the eye line of gaze is integrated into the image of the scene camera and the centre of a red cross characterizes the gaze location. The Mobile Eye was connected to a recording device, which was kept in a pouch around the waist. The recording device was connected to a computer through a FireWire cable of five meters to monitor the quality of measured gaze data.
The data obtained with the Mobile Eye and DV camera were analyzed together with Quiet Eye Solutions software (Version 1.0.2, www.QuietEyeSolutions.com). The recordings of the Mobile Eye and the DV camera were synchronized using a handclap by one of the experimenters, which was visible on both images. For gaze behavior, five different fixation locations were identified on the basis of the task in question. The fixation locations were the rim (main target), the floor (possible location during the dribble), the ball (the object to be dribbled, received, and thrown), the passer (from whom the pass is received), and ‘other’ (any location not relevant for the task). A fixation was defined as gaze directed at a single location for at least 3 frames or 99.9 ms [19,24]. The number and duration of fixations on each location were calculated for the pre-shot phase and the shot phase. Furthermore, the duration of the final fixation on the rim was determined.

**DESIGN**

The participants were tested in four different conditions: dominant dribble condition, non-dominant dribble condition, dominant pass condition, and non-dominant pass condition. In the dominant dribble condition, participants started at the left starting position (note that all...
participants were right-handed), performed a step and a dribble with their dominant right-
hand to reach the left shooting position, and took the jump shot (see Figure 1). In the non-
dominant dribble condition participants stood at the right starting position, performed a step
and a dribble with their non-dominant left hand to reach the right shooting position, and took
the jump shot. In the dominant pass condition participants started at the left starting
position without the ball, moved towards the left shooting position while receiving the ball
on the run from the right side before taking the jump shot. In the non-dominant pass
condition participants started at the right starting position without the ball, moved towards
the right shooting position while receiving the ball on the run from the left side before taking
the jump shot. The pass given in the pass conditions was a chest pass. This pass was chosen
because game statistics of women’s basketball from Thessaloniki (Greece) showed that, with
38.7%, the chest pass was given most often, followed by the overhead pass with 29.1% [25].

The participants executed a total of 100 shots in the experiment, 25 in each condition. To
prevent loss of gaze data (calibration of the Mobile Eye is easily disturbed while taking jump
shots) participants first performed five shots in each condition with the Mobile Eye
equipped, using a counterbalanced blocked design for type of action (dribble or pass) and
side (dominant, non-dominant). To obtain reliable shooting percentages, 20 additional shots
without Mobile Eye were taken per condition, resulting in 25 shots per condition. These
shots were counterbalanced for the dribble and the pass condition while participants switched
sides after each shot as if they were performing a training drill.

PROCEDURE
Participants were tested in pairs taking turns in shooting and passing. The measurements
lasted approximately 45 minutes. After an explanation of the task and conditions, participants
provided informed consent. Several practice shots were taken with the Mobile Eye mounted
to familiarize shooting with this equipment. Then, the eye tracker and the DV camera were
started. First, participants performed the trials with the Mobile Eye equipped. Thereafter the
Mobile Eye was removed and the participants executed the shots without the Mobile Eye.
After a signal from one of the experimenters, the participants each time started and
performed the condition in question at their own pace. Following each trial in the dribble
conditions, participants moved to the next starting position and received the ball for the next
trial from the other participant who had rebounded the ball. Following each trial in the
passing conditions, participants moved to the next starting position and the ball was returned
to the passer by an experimenter who had rebounded the ball.

STATISTICAL ANALYSIS
The dependent variables were shooting percentage per condition, pre-shot-phase and shot-
phase duration, average number of fixations, average duration of fixations, and duration of
the final fixation on the rim in the shot phase. Shooting percentages, average number of
fixations and duration of final fixation on the rim were subjected to a 2 x 2 within-subjects
ANOVA with repeated measures on type (dribble, pass) and side (dominant, non-dominant)
of the action preceding the shot. The pre-shot phase and shot phase duration were subjected
to a 2 x 2 within-subjects MANOVA with repeated measures on type (dribble, pass) and side
(dominant, non-dominant) of the action preceding the shot. The duration of fixations on the
different locations (floor, passer, ball, rim and other) were subjected to a 2 x 2 within-subjects
MANOVA with repeated measure on type (dribble, pass) and side (dominant, non-dominant)
for the pre-shot phase and shot phase separately. Effect sizes ($\eta^2_p$) and 95% confidence
intervals (CI) for main and interaction effects were calculated as well.
RESULTS
Not all participants had useful Mobile Eye data due to technical failure. As a result, the analyses for gaze behavior were executed for eight (instead of 11) participants.

SHOOTING PERCENTAGE
Mean shooting percentages for the separate conditions are presented in Figure 2. The ANOVA on shooting percentages showed a significant main effect of side, $F(1, 10) = 7.27$, $p < .05$, $\eta^2_p = .42$. Shooting after a dominant side action ($M = 59.6\%$, $SD = 9.8$), participants scored on average 6.6\% more than when they shot after a non-dominant side action ($M = 53.0\%$, $SD = 10.7$), 95\% CI [1.1, 12.0]. Additionally, results showed a marginally significant effect of type of action, $F(1, 10) = 4.38$, $p = .063$, $\eta^2_p = .31$. On average, participants hit 4.6\% more of their shots in the pass condition ($M = 58.6\%$, $SD = 8.0$) compared to the dribble condition ($M = 54.0\%$, $SD = 12.6$), 95\% CI [-0.3, 9.5]. There was no significant interaction, $F(1, 10) = 0.017$, $p = .90$, $\eta^2_p = .002$.

![Figure 2. Average Shooting Percentage and SDs Across Conditions](image)

$^2$Wearing the Mobile Eye (ME) did seem to have an effect on shooting performance. An ANOVA including a factor with/without ME yielded a significant main effect of this factor, $F(1, 10) = 9.7$, $p = .011$, showing that shot accuracy was lower with ME (49\%) compared to without ME (58\%). However, this factor did not interact significantly with the other two factors (side and type of action) while the main effect of side was still significant, $F(1, 10) = 5.0$, $p = .049$. The effect of type of action was no longer significant, $F(1, 10) = 1.84$, $p = .20$. However, “with ME” involved only 5 shots per condition which does not provide a reliable measure of performance. Therefore, and given that “with/without ME” only yielded a significant main effect, we feel it is justified to report the original analysis with all 25 shots per condition pooled together.
PRE-SHOT PHASE AND SHOT PHASE DURATION

Mean pre-shot phase and shot phase durations for the four conditions are presented in Figure 3. The MANOVA on these durations revealed significant multivariate effects of type of action, Wilks’s $\eta = .10$, $F(2, 9) = 42.50$, $p < .001$, $\eta_p^2 = .90$, and side, Wilks’s $\eta = .38$, $F(2, 9) = 7.49$, $p < .05$, $\eta_p^2 = .63$. Follow-up analyses showed that these significant main effects only existed for the pre-shot phase duration, for type $F(1, 10) = 28.25$, $p < .001$, $\eta_p^2 = .74$, and for side, $F(1, 10) = 15.36$, $p < .05$, $\eta_p^2 = .61$. The pre-shot phase lasted 351 ms longer in the pass condition than in the dribble condition, 95% CI [204, 499]. The pre-shot phase duration for actions with the dominant side lasted 81 ms longer than for actions with the non-dominant side, 95% CI [35, 128]. There was no significant interaction in the pre-shot phase, $F(1, 10) = .97$, $p = .35$, $\eta_p^2 = .09$.

In the shot phase, there were no significant main or interaction effects, $Fs < 1.6$, $ps > .23$, implying that in all conditions shot phases lasted about equally long.

AVERAGE NUMBER OF FIXATIONS

The average number of fixations across conditions are presented in Figure 4. The ANOVA for the average number of fixations showed a significant main effect of type of action, $F(1, 7) = 31.92$, $p = .001$, $\eta_p^2 = .82$. On average, participants executed 0.79 more fixations in the pass than in the dribble condition, 95% CI [0.46, 1.11]. The average number of fixations did not differ between actions with the dominant and non-dominant side. There was no significant interaction, $F(1, 7) = 2.94$, $p = .13$, $\eta_p^2 = .30$.

PRE-SHOT PHASE FIXATION DURATIONS

The MANOVA for the duration of fixations on different locations (floor, passer, ball, rim and other) in the pre-shot phase revealed a significant multivariate effect of type of action,
Wilks’s $\eta = .01$, $F(5, 3) = 132.05$, $p = .001$, $\eta_p^2 = 1.00$. Follow-up univariate analyses showed a significant main effect of type of action on fixation durations on the floor, passer, ball, and rim, and a marginally significant effect for fixation durations on other (see Table 1). In the pre-shot phase, fixation durations on the floor, rim and other were longer in the dribble compared to the pass condition. In the pass conditions, fixation durations on the passer and the ball were longer than in the dribble conditions. There were neither significant effects of side nor significant interaction effects, $F_s < 2.5$, $p_s > .20$. All these differences seem to follow quite logically from the differences between the tasks, with participants looking at the floor and rim in the pre-shot phase of the dribble conditions, and at the passer and ball in the pass conditions when receiving the pass.

![Figure 4. Average Number of Fixations and SDs Across Condition](image)

<table>
<thead>
<tr>
<th></th>
<th>Dribble M (SD)</th>
<th>Pass M (SD)</th>
<th>$F(1,7)$</th>
<th>$p$</th>
<th>$\eta_p^2$</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>280 (90)</td>
<td>0 (0)</td>
<td>9.63</td>
<td>.017</td>
<td>.58</td>
<td>[67, 493]</td>
</tr>
<tr>
<td>Passer</td>
<td>0 (0)</td>
<td>320 (70)</td>
<td>20.85</td>
<td>.003</td>
<td>.75</td>
<td>[154, 485]</td>
</tr>
<tr>
<td>Ball</td>
<td>0 (0)</td>
<td>970 (41)</td>
<td>548.36</td>
<td>.000</td>
<td>.99</td>
<td>[872, 1068]</td>
</tr>
<tr>
<td>Rim</td>
<td>460 (86)</td>
<td>13 (9)</td>
<td>28.32</td>
<td>.001</td>
<td>.80</td>
<td>[248, 646]</td>
</tr>
<tr>
<td>Other</td>
<td>91 (40)</td>
<td>0 (0)</td>
<td>5.10</td>
<td>.059</td>
<td>.42</td>
<td>[-4, 185]</td>
</tr>
</tbody>
</table>
DURATION OF THE FINAL FIXATION ON THE RIM IN THE SHOT PHASE

The durations of the final fixations on the rim during the shot phase are presented in Figure 5. The ANOVA on these final fixation durations revealed that the interaction between type and side of the preceding action just failed to reach significance, \(F(1, 7) = 5.55, p = .051, \eta_p^2 = .44, 95\% \text{ CI } [13, 80]; \) other \(Fs < 1, ps > .40.\) Pairwise post-hoc comparisons using Bonferroni correction revealed that when receiving the pass from the dominant side participants looked 46 ms longer at the rim (for 781 ms) than when receiving the pass from the non-dominant side (\(p = .013\)). No other comparisons were significant, so during the dribble conditions participants looked equally long at the rim irrespective of whether they dribbled with their dominant or non-dominant hand.

DISCUSSION

The main aim of the present study was to investigate the effects of different actions preceding the jump shot on basketball shooting in female basketball players, by measuring shooting percentage, task duration, and gaze behavior. As far as we know, it was the first time that this was investigated. The players took jump shots with their dominant hand after a dribble or receiving a pass either with the dominant or non-dominant hand. All players had large amounts of experience with any of the sub-skills involved, that is, receiving passes, dribbling and taking jump shots from a distance of about 5 m. In line with investigations of game-statistics in women’s basketball [3,7,26], it seemed that female basketball players shoot (4.6%) better after receiving a pass than after taking a dribble. Furthermore, as expected shooting percentages were significantly higher (6.6%) when the action preceding the jump shot was done with the dominant side compared to with the non-dominant side. That is, for the right-handed participants, when they performed the dribble with their dominant hand or
when they received the ball on their dominant side (from the right), shooting performance was better than after a left-handed dribble or receiving the pass from the left side. These percentages are not trivial, but practically highly relevant. As an example, in the NBA, the average difference in points between teams in a game is about 5 (nba.com). Roughly speaking, 85 Field Goal Attempts are performed on average per game, with about 40 being made (Field Goals Made), leading to a Field Goal percentage of 47%. An increase of about 5% in FG% would mean about 5 more hits (say 45 out of 85) and thus 10 more points. With the average of 5 points difference between opposing teams this implies that more games would be won by teams if they would achieve such higher percentages.

Interestingly, the actions preceding the jump shot lasted longer in conditions in which higher shooting percentages were achieved (see Figures 2 and 3). More specifically, the actions preceding the shot lasted longer when shooting after receiving a pass compared to shooting after a dribble (351 ms longer, 4.6% better shooting), and when executing a dominant side action compared to a non-dominant side action (81 ms longer, 6.6% better shooting). The difference in duration between the pass and dribble conditions may be due to the fact that in the pass conditions the timing of receiving the pass and reaching the shooting position were dependent on the passer, whereas the timing of the dribbles was fully self-controlled by the shooter. Whether or not the longer durations of the pre-shot phase played a role in causing the higher shooting percentages, is unclear. If they did, it seems that performance of the expert female basketball players in our experiment fits a typical speed-accuracy tradeoff, which states that executing a task more quickly leads to decrements in accuracy [27-31]. As the durations of the shot phase were equal in all conditions and comparable to durations reported in previous research [12,31], the speed-accuracy tradeoff (if it occurred) did not concern the speed of shooting itself but rather the speed of the preparatory movements leading up to the jump shot. This could mean that planning is facilitated by taking more time, leading to better shooting [28-31].

Alternatively or additionally, it may be that biomechanical differences played a role in the differences in shooting performance. As mentioned in the introduction, orienting towards the basket and alignment of the shooting side and arm may be different for the different actions preceding the shot. If a right-handed player dribbles with the right hand or receives the pass from the right side prior to a shot, the ball is already at the shooting side of the body. In case of a left-handed dribble or a pass from the left, the ball has to be moved from the left side to the right side of the body while taking the shot. Thus perhaps receiving a pass on the dominant side simply provided the best angle of approach (e.g., biomechanically) to execute the jump shot. For example, take-off velocities may be more optimal when shooting after receiving a pass compared to after a dribble. Previous studies already showed that take-off velocities differed in female basketball players when shooting after a dribble or after receiving a pass, respectively 45-50 cm/s and 22 cm/s [9,33]. Type and side of the actions preceding the shot may also have affected other biomechanical aspects of shot execution, such as balance and joint angles. However, more research is needed to test these hypotheses.

A third possibility is that differences in gaze behavior played a role in the differences in performance. In general, in aiming tasks, longer final fixations on the target enhance performance (e.g., [19,24,34-36]). Overall participants looked at the rim longer in the dribble compared to the pass condition (because they also looked at the rim in the pre-shot phase in the pass conditions). However, shooting percentages were lower in the dribble compared to the pass conditions. So, looking longer in the dribble conditions did not lead to better shooting. Moreover, the differences in gaze behavior between the dribble and pass conditions seem to have followed logically from the nature of the tasks. Participants looked at the passer
and the ball when receiving the pass in the pass conditions, while participants looked at the floor or the rim during the dribble in the dribble conditions. Furthermore, it seems that in all conditions participants looked at the rim long enough during the shot phase to achieve good performance. Considering that approximately 350-400 ms of seeing the rim during the shot phase is necessary and sufficient for accurate shooting [13,14,17] (cf. [36]), the final fixations on the rim during the shot phase (on average over 700 ms) should have offered participants more than sufficient time to detect relevant information from the rim. Note that in the pass conditions, receiving the pass from the dominant (right) side was accompanied by longer final fixations on the rim during the shot phase (780 ms) as well as better shooting (62%) than when receiving the ball from the left side (730 ms and 55%, respectively). However, as just mentioned, 730 ms of looking at the rim should be more than enough for accurate shooting in basketball ([13,14,17,36]), so it remains questionable whether the differences in gaze behavior explain the differences in shooting performance among conditions in the current experiment.

CONCLUSION

The results of our study showed that shooting percentages of female basketball players were affected by the actions performed prior to the jump shot. Higher shooting percentages were achieved when the right-handed players shot after a pass compared to after a dribble, and after a dominant side action compared to a non-dominant side action. Although differences in gaze behavior could potentially explain these differences, the results are ambiguous and the actual jump shot offered participants enough time to detect relevant information from the rim and achieve good shooting percentages. More likely explanations for why shooting was better after a pass and after a dominant side action are the time taken to execute the action just prior to the shot (taking a bit more time seemed to have resulted in better shooting) and the biomechanical consequences of making an action with the dominant side (ball already in shooting hand on shooting side) or non-dominant side (ball has to be moved from non-dominant side across the body to the shooting hand and shooting side). The relationship between these aspects of the actions preceding the shot and shooting percentages are still not entirely clear. Future research should incorporate kinematic measures, such as orientation of the body towards the basket, take-off velocities, balance transfers, and joint angles, in similar conditions to gain more insight into the biomechanical differences between shooting after different actions and their relationship to performance.

Furthermore, it is important to bear in mind that our findings regarding side and type of action in basketball shooting systematically (and intentionally) excluded all kinds of other factors that may play a role in actual basketball competition. More research is needed to find out in what way assisted shots and unassisted shots in actual basketball games differ, for instance, regarding distance of the shots from the basket (are assisted shots on average taken from closer by as more layups and dunks are included?), distance to the opponent (are opponents further away from the shooter on assisted shots?), and execution of the shots (are assisted shots and shots taken after a dribble executed in a different way?). Insight into the effects of these factors may provide useful insights for training and coaching.

As mentioned, for teams, achieving game shooting percentages that are about 5% higher (as found in the current study), may have a large impact on the number of games won. On the basis of the current findings, it seems most beneficial for coaches to exploit game tactics that favor shots after receiving a pass rather than after a dribble, and preferably from the side of the dominant (shooting) hand. Of course, to achieve higher shooting percentages, players could also shift their emphasis in shot training on taking more shots after a dribble and after making the action prior to the shot with the non-dominant hand.
ACKNOWLEDGEMENTS
The authors would particularly like to thank head coach Remy de Wit, but also the other staff members as well as the players of the CTO Amsterdam Women Basketball talent program for their cooperation.

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