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## Order effects in attributions of sporting abilities in team handball

### Abstract:

Our study explores the role of order effects when making attributions of ability of a performer in team handball. Participants of the study were asked to view a video footage of a handball player performing a passing and throwing task ten times. Although for everyone the footage consisted of the same ten clips, half the participants viewed a declining (successful to unsuccessful) performance pattern, whereas the other half viewed an ascending pattern. After that, participants rated the observed player's sporting abilities. The results have shown recency effects in the attributions of ability when the judgment was made by players (for most descriptors) and by coaches (for some descriptors).

### Keywords:

recency effect, sporting abilities, judgment, decision making, team handball

### Streszczenie:

Celem niniejszej pracy było zbadanie roli efektów kolejności w dokonywaniu atrybucji umiejętności sportowych zawodnika piłki ręcznej. Uczestnicy badania zostali poproszeni, aby obejrzeć materiał filmowy, na którym sportowiec dziesięć razy wykonuje ćwiczenie związane z podawaniem i rzucaniem piłki. Każdy uczestnik obejrzał film składający się z tych samych dziesięciu powtórzeń ćwiczenia, z tym, że połowa uczestników obejrzała opadający wzorzec wykonania (od dobrego do słabego), natomiast druga połowa obejrzała wznoszący wzorzec wykonania (od słabego do dobrego). Następnie, uczestnicy badania oceniali umiejętności sportowe oglądanego zawodnika. Wyniki ujawniły efekt świeżości, gdy ocena była dokonywana przez zawodników (dla większości umiejętności) oraz trenerów (dla niektórych umiejętności). Nie było natomiast żadnych efektów kolejności w grupie laików (nieznających się na piłce ręcznej).

### Słowa kluczowe:

efekt świeżości, umiejętności sportowe, ocena, podejmowanie decyzji, piłka ręczna

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## Introduction

It is interesting to know what influences people's judgments about others and what can be done to maximize the chances of being evaluated well or at least accurately and objectively. Does the order of information about a performer received by the observer have an impact on the assessment? Sometimes when performing a task, people start well but decrease their execution over time, and finish poorly. In other situations, they may begin badly but gradually ascend their performance, and finish well. It is, therefore, interesting to determine what is more profitable in terms of an overall evaluation at the end of a task: to start well and finish poorly or vice versa? Or perhaps, the assessment depends on how familiar the task is with the person making the judgment? These questions are related to the research area on primacy and recency effects – jointly called the order effects (e.g. Asch, 1946). Although, there is a growing body of knowledge related to this area, the conclusions are far from unequivocal (e.g. Chapman, Bergus, & Elstein, 1996; Newton, & Rindner, 1979). Further, even common knowledge seems to support both primacy and recency similarly. For example, saying “Well begun is half done” stands in favor of primacy effects. On the other hand, “All is well that ends well” supports recency effects. However, there are also sayings suggesting that there are no order effects: “*Quale principium, talis et clausula*” (Engl.: the way you begin, the way you will end), or warning against order effects (e.g. “never praise a ford till you get over”). Therefore, it is still unclear which situations favor primacy, and which recency effects; and what other factors may influence the appearance, direction, and intensity of order effects.

In the sporting context, primacy effect may indicate that the beginning of a performance is of a greater value than its end in terms of evaluating an athlete's overall sporting abilities. On the other hand, the recency effect suggests that the end of a performance has a greater and more decisive value. Both coaches and athletes are frequently evaluated by club owners, media, and fans. It is thus important to understand, how these judgments are made and what biases might occur in this type of data processing and decision making. Plessner and Haar (2006) have reviewed potential cognitive mistakes in this area. Order effects has been identified as one such bias in the sporting environment (e.g. Greenlees, Dicks, Thelwell, & Holder, 2007). Other unconscious biases in sports include: heuristic reasoning (Miller, Rowe, Cronin, & Bampouras, 2012), prior exposure effects (Ste-Marie, Valiquette & Taylor, 2001), expectation effects (Buscombe, Greenlees, Holder, Thelwell, & Rimmer, 2006), or halo effects (Moormann, 1994). This knowledge may be used to develop strategies that protect judgments from being biased. Our current study aims to extend the findings related to judgment and decision-making by bringing new elements (e.g. new sport discipline, different stimulus material, new evaluation method) to the hitherto research on order effects in sport.

## **Origins of order effects**

A lot of the early studies relating to order effects were conducted within the research on human memory (e.g. Atkinson & Shiffrin, 1968; Ebbinghaus, 1885; Glanzer & Cunitz, 1966). In this area, important findings were shown in relation to both primacy and recency effects (e.g. Curley, Young, Kingry, & Yates, 1988; Ley, Bradshaw, & Walker, 1975; Miller & Campbell, 1959). However, our current study is linked primarily to the impression-formation research started by Asch (1946). This author, one of the most influential in social psychology, carried out a study in which he asked participants to view six adjectives (intelligent, industrious, impulsive, critical, stubborn, envious) that described a non-existing person. The order of the adjectives was manipulated between two groups: the first group viewed the positive to negative order (as above), and the second one viewed the adjectives inversely – negative to positive. Subsequently, they were asked to give their impressions of the viewed person. It appeared, that the first group (positive to negative order) evaluated the person more favorably than the second group (negative to positive order), indicating primacy effects. These findings have brought a lot of research attention to this area (e.g. Anderson, 1965; McKelvie, 1990), but has also brought a broad critique related to the methods used in Asch's study (Luchins, 1948).

In the literature, there are at least three explanations for the emergence of order effects in relation to impression formation. The first, proposed by Loftus and Loftus (1976), suggests that along with the sequence of elements, people gradually devote less attention to them. The second explanation is related to the cognitive dissonance theory (Festinger, 1957). The third explanation is related to gestalt psychology, and suggests that the first information we receive about a person creates a context for interpretation (anchor, expectancy), to which subsequent elements are added and adequately adjusted (e.g. dull and hard working vs. smart and hard working; Asch, 1946). This explanation seems to be the most convincing in relation to impression formation, as on its ground it may be predicted when primacy effects fade, or get replaced by recency effects. Referring to this explanation, Hogarth and Einhorn (1992) proposed a belief-adjustment model which includes six factors that are to account for the appearance and direction of order effects. This model has received significant confirmation in order effects research (e.g. Adelman, Tolcott, & Bresnick, 1993; Chapman, Bergus, & Elstein, 1996). However, some studies have shown findings which were inconsistent with the described assumptions (e.g. Greenlees, Dicks, Thelwell, & Holder, 2007). Thus, the level of correctness of this model needs to be further investigated.

## Order effects in sport and other areas

In one study in the realm of medicine, Curley, Young, Kingry, and Yates (1988) found that primacy may occur when making decisions about the probability of a disease. On the other hand, Chapman, Bergus, and Elstein (1996) identified recency effects. As for jury decision making, both primacy and recency effects have been identified (Miller & Campbell, 1959; Insko, 1964). A number of studies focused on revealing order effects in making ability attributions (e.g. Allen & Feldman, 1974; Benassi, 1982; Jones, Rock, Shaver, Goethals, & Ward, 1968; Newton & Rindner, 1979). Most of these results have shown strong primacy effects.

In sport, Greenlees, Dicks, Thelwell, and Holder (2007) investigated order effects in making judgments about soccer abilities. Their participants (soccer coaches, soccer players, and non soccer-players) viewed a video footage presenting a control and target soccer player performing a passing task. For the control player, all participants viewed the same footage in the same order, and there were no differences in judging this player. As for the target player, there were two versions of the footage, to which participants were randomly assigned. Both versions comprised the same clips, but inversely. The first version presented an ascending performance pattern, whereas the second presented a declining performance pattern – similar to the methodology used by Jones et al. (1968). The results have shown primacy effects in all the participants' soccer abilities, regardless of their soccer experience and judgment mode (end of sequence vs step by step; Hogarth & Einhorn, 1992). Participants viewing the declining performance pattern rated the target player higher than those viewing the ascending pattern. It was unexpected that non-soccer players, although inexperienced in soccer, rated the target player in a similar way as coaches and soccer players. This was inconsistent with Hogarth and Einhorn's model (1992) which suggests that high complexity of the task should lead to recency effects.

In another study it was found that warnings given to observers about possible biased judgments due to order effects may eliminate those effects (Greenlees, Hall, Filby, Thelwell, Buscombe, & Smith, 2008). Soccer coaches were the only group of participants in this study. Further methodology was based on that used by Greenlees et al. (2007). Primacy effects were found in those participants who did not receive warnings and those that received warnings just before rating the player. In the group that was given warnings before viewing the footage, no order effects were found.

In the third study on order effects in sport, a new discipline was considered (ultimate frisbee) and some modifications in the judging procedure were introduced (Smith, Greenlees, & Manley, 2009). The results revealed that order effects were eliminated only in the group where the step by step mode with a long delay after each clip was present. In all other groups primacy effects occurred, as the initial information had a greater im-

pact on the overall rating of the target player's sporting (ultimate frisbee) abilities. As suggested by Greenlees et al. (2007) research on order effects should include new sport disciplines, new methodologies, and so on. However, earlier works (e.g. Tyszka & Wielochowski, 1991) should also be taken into consideration.

In relation to the hitherto research on order effects in sport, several research questions have been put forward. Their aim is to verify the existing findings, and attempt to explore new ones. First, do order effects influence the judgment of the target handball player? Second, can the influence of order effects on judgment depend on how familiar the task is? And third, is there a relationship between the target player's handball ratings and the ratings of his maximum sporting potential?

## Materials and Methods

### Participants

There were 182 participants in our study, from three different groups. The first group consisted of 44 handball coaches (35 men, nine women); Their mean age (in years) was  $M_{\text{age}}=39.09$ ;  $SD=8.68$ , and their coaching experience (in years) was  $M=13.61$ ;  $SD=9.41$ . For this group, the study took place at a hotel during a training/conference for handball coaches organized by The Polish Handball Association. The second group included 66 (all male) junior handball players aged (in years)  $M_{\text{age}}=15.47$ ;  $SD=0.6$ , with handball experience (in years)  $M=5.06$ ;  $SD=1.42$ . These participants took part in the study during a handball tournament. The third and last group contained 72 laypersons (people who never practiced handball regularly). These were all males (mostly students) aged (in years)  $M_{\text{age}}=22.14$ ;  $SD=2.82$ , with no handball experience. They participated in the study at The Warsaw University Library. All 182 participants were Polish. Finally, no ethical contraindications were put forward in relation to our current study.

### Materials

The stimuli used in this study to cause potential order effects included two versions of a video footage. These were filmed with a Sony PD 170 video camera in one venue (sports hall) and later edited using the CyberLink PowerDirector v8 computer program. Both footage versions present an 18 year-old male team handball player from a leading team. On both videos the player performs a handball task ten times (ten clips). The task consists of running, passing the ball twice, receiving the ball twice, jumping, and throwing the ball in the middle of an empty goal. No participant in the study declared knowing the player shown in the stimuli material. The ten clips that form both videos include four poor examples of task execution, two moderate examples, and four good examples (Table 1). Further, both versions last the same length of time (1 minute and 8 seconds) and

comprise exactly the same clips (examples of task execution). The only difference is that the clips within these videos are placed in inversely. In one version there is an ascending performance pattern (from poor to good task execution), and in the other one there is a declining performance pattern (from good to poor), similar to the methodology used by Greenlees et al. (2007).

It is important to note that the poor, moderate and good task executions were categorized on the basis of a pilot study which involved competent raters, particularly 20 senior male handball players, aged (in years)  $M=24.85$ ;  $SD=4.25$ , with handball experience (in years)  $M=12.35$ ;  $SD=4.2$ . They were asked to evaluate 32 examples of task execution, described previously, in terms of their quality. This judgment was given on a 10-point Likert-type scale (ranging from 1– very poor execution, to 10 – very good execution). Using a one-way ANOVA:  $F(31, 589)=42,86$ ,  $p<.001$ ,  $\eta^2=.69$ , from among the 32 task examples, 10 were chosen for the stimuli material utilized in the main study. Because Mauchly's test was significant and the sphericity assumption was not met, the Greenhouse-Geisser correction was utilized. Follow-up post hoc using a Bonferroni correction revealed that the task's four poor executions, two moderate executions, and four good executions differed in quality in a statistically significant manner (each category differed from the other two, and there were no statistically significant differences within the categories). Table 1 presents the content of the two video versions that were utilized in the current study.

**Table 1**

*Summarized content of stimulus videos. Each clip (exemplifying the task) is described by its quality of execution and mean rating (along with standard deviation [SD])*

Clip number	Ascending pattern		Declining pattern	
	Quality of execution	Mean (SD)	Quality of execution	Mean (SD)
1.	poor	2.55 (2.21)	good	8.25 (1.25)
2.	poor	2.15 (1.57)	good	8.3 (1.45)
3.	poor	2.6 (1.64)	good	7.75 (1.52)
4.	poor	1.6 (1.19)	good	8.05 (1.43)
5.	moderate	5.55 (1.43)	moderate	4.9 (1.65)
6.	moderate	4.9 (1.65)	moderate	5.55 (1.43)
7.	good	8.05 (1.43)	poor	1.6 (1.19)
8.	good	7.75 (1.52)	poor	2.6 (1.64)
9.	good	8.3 (1.45)	poor	2.15 (1.57)
10.	good	8.25 (1.25)	poor	2.55 (2.21)

Note.

The rating of the player in the pilot study (as well as in the main study) was performed on a scale from 1 (very poor) to 10 (very good).

Other materials used in our main study included two laptops (HP Compaq 6720s, HP Pavilion dv6) and a projector (Optoma PK201). These were necessary for the participants to view the footage with the player, and for the evaluation using the mouse paradigm, which requires two computers at the same time.

**Measures**

All the participants were asked to complete paper-pencil measures on sporting abilities, which involved rating the player on six variables (subscales): speed, technical ability, strength, jumping ability, work ethic, and the player’s maximum sporting potential. The first five abilities were averaged to create a general variable called “sporting abilities”. Maximum sporting potential was analysed separately. The answers to the questionnaire were given on a 10-point Likert-type scale. The higher the number on the scale (the closer it was to number 10), the higher the rating (i.e., 1 – very poor to 10 – very good).

In order to assess the data for multicollinearity, Pearson product-moment correlations were conducted on the dependent variables. All six variables included in the paper-pencil measures of sporting abilities were taken into consideration. In each case the correlations were much lower than .7. Therefore, following Tabacknick and Fidell (1996), it can be argued that the variables measured by the questionnaire represent different theoretical constructs. All of these correlations are presented in depth in Table 2.

**Table 2**

*Intercorrelations between the questionnaire subscales (N = 182). All the correlations were statistically significant at the p < .001 level.*

Variable (subscale)	2.	3.	4.	5.	6.
1. Speed	0.52	0.51	0.39	0.37	0.5
2. Technical ability		0.44	0.51	0.38	0.48
3. Strength			0.48	0.26	0.45
4. Jumping ability				0.43	0.52
5. Work ethic					0.6
6. Potential*					

Note.

\* – Maximum sporting potential.

## Procedure

At the beginning, each participant group (coaches, players, and laypersons) had been informed that the purpose of the study was to understand how different people evaluate sporting abilities in team handball. It was also mentioned that participation in the study was voluntary and that one could withdraw at any moment. The participants were also informed about the study's planned duration (approximately 10 minutes) and that they could receive the results by e-mail. Subsequently, all participants signed consent forms. Concerning under-age junior handball players, their legal guardians during the time of the tournament (their coaches) had to sign additional participation agreements.

As previously mentioned, each participant group took part in a different place. For coaches and players, the study was very similar: each person was randomly assigned to one of two groups, viewing the footage with either the ascending or declining performance pattern. For each group the footage was presented on a large screen via projector. Since each person could only view one of the footage versions, there was a need for a second room. When participants from the first group finished viewing their footage (with the ascending pattern), they moved to a nearby room, and the second group entered the room with the projector and viewed the footage with the declining performance pattern. As for the laypersons, they viewed the video individually on a laptop, and not as a group via projector. Having viewed the footage, all 182 participants was asked to complete measures on sporting abilities (end of sequence judgment). Once all participants had finished, additional questions about the details of the study were answered and full debriefing as to the nature of the study was provided.

## Results

To explore the impact of order effects and familiarity on the target player's ratings, a 2 (poor-good versus good-poor) x 3 (coaches versus players versus laypersons) MANOVA was conducted. This analysis was computed for the "sporting abilities" variable (the average of 5 abilities). Maximum sporting potential will be discussed separately in the next paragraph. It appeared that the main effect for order  $F(1, 176)=8.82, p<.01, \eta^2=.05$ ; main effect for familiarity:  $F(2, 176)=15.46, p<.001, \eta^2=.15$ ; and interaction effect (order by familiarity):  $F(2, 176)=3.26, p<.05, \eta^2=.04$ , were all statistically significant. Due to the fact that order effects were revealed, simple effects for this variable were analyzed in depth. The outcomes appeared to be the most convincing in the junior handball players' group. Within this group, participants who viewed the footage with ascending performance pattern ( $N=36$ ) rated the overall handball player's abilities higher than the participants who viewed the declining performance pattern ( $N=36$ )  $t(70)=3.71; p<.01, \eta^2=.14$ . This sug-



gests that recency effects were present in the attributions of ability in the junior handball players' group. In the group of coaches similar results were obtained, but only at the statistical tendency level. Particularly, coaches who saw the ascending performance pattern ( $N=22$ ) rated the player's handball abilities higher than the coaches who saw the declining performance pattern ( $N=22$ )  $t(42)=2.01$ ;  $p=.051$ ,  $\eta^2=.09$ . Therefore, also in the group of coaches recency effects are likely to have appeared when making attributions of handball abilities. As for laypersons, no order effects were found in this group. Laypersons who viewed the ascending performance pattern ( $N=33$ ) did not differ from the laypersons who viewed the declining performance pattern ( $N=33$ ) when rating handball abilities  $t(64)=0.32$ ;  $p>.05$ ,  $\eta^2<.001$ .

The outcomes were similar for the ratings of the target player's maximum sporting potential. Again, a 2 (poor-good versus good-poor) x 3 (coaches versus players versus laypersons) MANOVA was used. Similarly as before, the main effect for order:  $F(1, 176)=16.69$ ,  $p<.001$ ,  $\eta^2=.09$ ; for familiarity:  $F(2, 176)=10.61$ ,  $p<.001$ ,  $\eta^2=.11$ ; and for the interaction effect (order by familiarity):  $F(2, 176)=6.79$ ,  $p<.01$ ,  $\eta^2=.07$  were all statistically significant. Particular simple effects within the main effect of order were analyzed. Once again, both junior handball players and coaches who saw the ascending performance pattern rated the target player's maximum sporting potential higher than those who saw the declining performance pattern. The results of t-tests for this variable in the junior players' group:  $t(70)=3.14$ ;  $p<.01$ ,  $\eta^2=.12$ , and in the group of coaches:  $t(42)=3.49$ ;  $p<.01$ ,  $\eta^2=.23$ , support the findings suggesting recency effects in these two groups. What is more, in the group of laypersons, as before, no order effects occurred,  $t(64)=0.38$ ;  $p>.05$ ,  $\eta^2<.001$ . All means (and standard deviations) related to the above results can be seen in Table 3.

**Table 3**

*The target player's mean ratings (and standard deviations) as a function of the footage (order: ascending vs declining) and handball experience (familiarity: coaches vs players vs laypersons)*

Judgment*	Ascending pattern (poor-good)			Declining pattern (good-poor)		
	Coaches	Players	Laypersons	Coaches	Players	Laypersons
1. Sport Ab.	5.95 (1.37)	5.87 (1.14)	6.45 (1.32)	5.09 (1.48)	5.03 (0.97)	6.56 (0.98)
2. Speed	6.36 (1.47)	6.22 (1.4)	6.88 (1.47)	5.81 (2.11)	5.39 (1.05)	6.87 (1.19)
3. Tech. Ab.	5.68 (1.73)	4.97 (1.81)	6.24 (1.64)	4.82 (1.99)	4.83 (1.68)	6.76 (1.41)
4. Strength	6.32 (1.81)	6.67 (1.57)	6.85 (1.6)	6.18 (1.74)	5.92 (1.78)	7.12 (1.49)
5. Jump Ab.	5.82 (2.11)	5.67 (1.74)	5.88 (1.75)	4.77 (1.6)	4.89 (1.47)	5.85 (1.39)
6. Work ethic	5.59 (2.11)	5.83 (2.27)	6.42 (2.15)	3.86 (2.23)	4.14 (1.68)	6.12 (1.9)
7. Potential	7.09 (1.63)	6.53 (1.16)	7.03 (1.4)	5.23 (1.9)	5.58 (1.38)	7.18 (1.26)

Note.

\* – the judgment included: speed (2), technical ability (3), strength (4), jumping abilities (5), work ethic (6), sporting abilities (1 – average of the 5 abilities), and maximum sporting potential (7).

Additionally, a strong relationship was found between the player's sporting abilities ratings (the average of 5 abilities) and the maximum sporting potential. The Pearson product-moment correlation, which included all participants ( $N=182$ ) revealed the following results:  $r(180)=.7; p<.001$ .

When analyzing particular components within the "sporting abilities" variable (namely: speed, technical ability, strength, jumping ability, and work ethic) it was seen that only some of them received satisfactory statistical properties regarding the appearance of recency effects. In this case we are talking about the results obtained in coaches and junior handball players, as only in these groups order effects had an impact on attributions of ability. In the laypersons' group, the results of t-tests were statistically insignificant in relation to all five abilities.

The best results were found for work ethic (players:  $t(70)=3.6; p<.01, \eta^2=.16$ ; coaches:  $t(42)=2.64; p<.05, \eta^2=.14$ ; laypersons:  $t(64)=0.38; p>.05, \eta^2=.01$ ). Jumping ability showed decent statistical properties players:  $t(70)=2.05; p<.05, \eta^2=.06$ ; coaches:  $t(42)=1.85; p=.071; \eta^2=.08$ ; laypersons:  $t(64)=.12; p>.05, \eta^2<.001$ ). For speed, results were statistically significant in the group of players:  $t(70)=2.86; p<.01, \eta^2=.11$ , but not in the remaining two groups (coaches:  $t(42)=1; p>.05, \eta^2=.02$ ; laypersons:  $t(64)=0; p>.05, \eta^2<.001$ ). Similar properties, but only at the level of statistical tendency, were found in relation to strength players:  $t(70)=1.9; p=.062, \eta^2=.05$ ; coaches:  $t(42)=.26; p>.05, \eta^2<.001$ ; laypersons:  $t(64)=.68; p>.05, \eta^2=.01$ ). The worse results (fully insignificant) appeared for technical ability players:  $t(70)=.34; p>.05, \eta^2<.001$ ; coaches:  $t(42)=1.54; p>.05, \eta^2=.05$ ; laypersons:  $t(64)=.4; p>.05, \eta^2=.03$ ). The overall summary of statistical significance levels for all the dependent variables is shown in Table 4.

**Table 4**

*Statistical significance levels for the differences between the target player's mean ratings of particular abilities as a function of handball experience (familiarity: coaches vs players vs laypersons)*

Rating/Group	Coaches	Players	Laypersons
Sport. Ab.	#	**	is.
Speed	is.	**	is.
Tech. Ab.	is.	is.	is.
Strength	is.	#	is.
Jump Ab.	#	*	is.
Work ethic	*	**	is.
Potential	**	**	is.

Note.

is. – insignificant difference; # – statistical tendency; \* –  $p<.05$ ; \*\* –  $p<.01$

## **Discussion**

It has to be said that the most important result of our study, related to the impact of footage on the target player judgments, is quite unexpected. In general, team handball coaches and players were prone to recency effects when making their judgments, whereas laypersons' decision making was not affected by order effects. Such outcomes are not consistent with the hitherto results on order effects in sport (particularly: Greenlees et al., 2007; Greenlees et al., 2008, Smith et al., 2009). In these studies, primacy effects were dominant, in some circumstances there were no order effects, but recency effects did not occur at all. What is more, when the judgments were made by laypersons (non-football players in Greenlees et al., 2007) – they were prone to order effects in the same way as judgments made by coaches or players who were more experienced and should be more familiar with the task. This difference between the current and the previous research may be due to the fact that the study by Greenlees and colleagues (2007) referred to soccer (football), and was conducted in England which is the homeland of this sport. In that country, soccer has enormous popularity, and even laypersons may have enough knowledge about the crucial abilities required in this sport. This may be the reason for which no differences were found between the soccer coaches, soccer players and non-soccer players. By contrast, our study refers to abilities in team handball which, despite the recent successes of the Polish national handball team, is not a very popular sport in Poland, and is rarely seen on television. Thus, a layperson's knowledge in handball is much different than the knowledge of a person who is involved in this sport on a regular basis. Consequently, laypersons, who may have not understood the task, could make their judgments in a relatively random way. The abstractedness of the judging task in the laypersons' group may have weakened their motivation to perform well, which, in turn, may be linked to the lack of order effects in their decisions (Biddle, 2001; Sarrazin et al., 1996). Perhaps, increasing the laypersons' motivation to rate the target player thoroughly and accurately would make the task complex (difficult), but not abstract. This, in turn, could move the results in the direction of recency effects, as appeared in coaches and junior handball players. Additionally, creating a research situation in which participants would be accountable for their judgments could also impact on the potential appearance and direction of order effects (e.g. Cushing & Ahlawat, 1996; Kennedy, 1993).

Among the coaches and junior handball players the motivation to rate the target player's abilities correctly should be high, as it is they who can be treated as experts in that area. Consequently, when people are motivated to process data thoroughly (e.g. to view a footage with a player, and to rate it accurately), they may use the step by step mode of judgment in their minds (gradually, throughout the viewed performance), even though the real judgment appears only at the end of sequence mode (Petty & Wegener,

1998). Further, as suggested by Hogarth and Einhorn (1992), processing (and judging) in a step by step mode promotes recency effects, and in this respect would be consistent with our study's findings. What is more, we are not sure whether the judging task used in this study was an easy one (not complex enough) for coaches and players. Even though they (especially coaches) can be treated as experts in this sport, they may not have had the chance in the past to rate a target player on six aspects by having seen just a short footage (1 minute and 8 seconds). Numerous comments were made by the participants indicating they did not have enough information to rate the target player accurately; thus this task might have been difficult (and complex) even for them due to the particular research conditions of our study. In this respect, the obtained recency effects would also be consistent with Hogarth and Einhorn's (1992) belief-adjustment model.

It is a significant limitation of our study that the video footage (on basis of which the judgment was made) included only a short and relatively simple handball exercise performed by one player. Short footage duration promotes a small number of units to be processed in the observer's mind, which could also contribute to the appearance of recency effects in our study (Hogarth & Einhorn, 1992). If the footage were longer, more advanced and diverse, and included interactions between several players – the ecological validity of these results could be higher. This is a guideline for future research in this area.

Despite the fact that our study used a similar research method as the one described by Greenlees and colleagues (2007), there were also differences that could have an impact on the different directions of order effects in those two studies. First, in the study by the British authors the video footage consisted of eight clips (3 good, 2 moderate, and 3 poor task executions), lasting about 10 seconds each, whereas the footage used in our study included 10 clips (5–6 seconds each). Consequently, a single clip (one task execution) was longer (and most likely more diverse) in the British study, and thus, it may have provided more information about the target player to the participants, making the whole judging task less complex. This, in turn, as discussed before, should favor primacy effects. Another limitation of our study is that no control player was included. The ratings of such a player could decisively exclude the potential impact of specific group characteristics (as a confounding variable), on the results.

The instruction given to participants in our study was similar to the one used by Greenlees and colleagues (2007), meaning that the ratings regarded “the sporting abilities of the target handball player”. However, apart from different sport disciplines used in both studies, the difference in the meaning of words “ability”, and Polish “umiejętność” seems to be of more significance. The Polish word we used (even though it is a direct translation of the word “ability”) describes a characteristic which is changeable, acquir-

able, modifiable, and which can be developed (but definitely is not always stable throughout life). English “ability” can be understood to be the same but, on the other hand, may also be seen as something constant, durable, or even in-born (Durand-Bush & Salmela, 2001, Gracz & Sankowski, 2000). This difference may be important in relation to the theoretical findings suggesting that individuals who perceive “ability” as something stable are more prone to primacy effects in their judgments. On the contrary, individuals who perceive “ability” as a changeable characteristic should, more likely, display recency effects in their judgments (Butler, 2000; Jones & Goethals, 1987). Because of the fact, that the Polish word “umiejętność” (with its specific meaning described above) was used in our study, this could also have an impact on the direction of the obtained order effects. Moreover, as described in the method, the target player in the footage was an 18 year-old male, thus a person who may be perceived as a youngster (still learning and unstable in terms of developing the required abilities; Jones & Welsh, 1971). This fact might also be related to the outcomes of our study.

It was also shown that order effects in the judgments of the target player influences only some measured abilities, but not all. This was not observed in the previous studies on order effects in sport (e.g. Greenlees et al. 2007), where all abilities contributing to the general variable received statistically significant order effects results. In general, in our study recency effects appeared only for work ethic, jumping ability, speed, maximum sporting potential, and strength (but only at the statistical tendency level in the group of players). Technical ability was found absolutely insensitive to the footage version manipulation. Work ethic, as the only ability in this study may be treated as more psychological than physical, and thus it could be even more difficult to rate on such short video footage. If this particular rating was a highly complex task, then, as discussed, this should favor biases in decision making that lead towards recency (Hogarth & Einhorn, 1992). Obtaining recency effects in work ethic, as well as other mentioned abilities may also be due to the fact that the quality of performance differs to the “naked eye” between poor, moderate, and good task executions (e.g. fast versus slow running). However, in respect to technical ability, these differences might not have been as visible, and the target player might have performed similarly (in terms of this particular ability) on the three performance levels. This might be the reason for the lack of order effects for technical ability. Furthermore, junior handball players appeared to be more susceptible to order effect biases (significant results for all abilities, apart from technical ability) than coaches (only work ethic, jumping ability, and maximum sporting potential). This is also reflected in the fact, that in the general (averaged) judgment of sporting abilities, the results in the coaches’ group were significant only at the statistical tendency level. This could be, since the coaches were more experienced in handball than the players, and thus

could form more adequate ratings of the target player, which partly protected them from order manipulation. Besides, the coaches' group was less numerous ( $N=44$ ) than the group of players ( $N=66$ ), which might have had an impact on the results as well. An intuitive result that does not require long discussion seems to be the case in the strong and positive relationship between the target player's sporting abilities ratings and the ratings of his maximum sporting potential. It is natural that when we have a positive opinion about an athlete, we tend to see his future in bright colors.

## Conclusions

To conclude, it is necessary to emphasize that our current work successfully approached the research questions that were put forward. Most of all, biases in the attributions of ability caused by order effects, was largely confirmed. However, the direction taken by the order effects was different from the one observed in most other studies, as recency (not primacy) effects were found. What is more, recency effects were identified only in judgments made by team handball coaches and players, but not laypersons – whose ratings of the target player were not influenced by order effects. Our study's practical implications may provide useful information to people of sport that are to be evaluated (e.g. players), and to those who make judgments of others (e.g. coaches). The results showed that biases in judgmental decision making may be made in sport settings and, therefore, some parts of an athlete's performance might be greater in value than other parts in terms of an overall evaluation. There is, however, a need for more studies within this research area to better understand the phenomena involved.

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