

The Role of Emotions for 4 Athletes in Nordic Combined in Ski Jumping Competitions in World Cup

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ABSTRACT

This study looks at how emotions were associated with ski jumping competitions in world cup for four athletes representing the Norwegian national team in Nordic combined. The athletes documented their emotional experiences during competition rounds (trial-, and competition rounds) and non-competitive episodes (the period just after the competition round). The results in this study show that there is no clear relationship between emotions and performance between- and within the different episodes among the athletes. However, both hedonic emotions and eudaimonic emotions were experienced at high levels across all the measured episodes. Eudaimonic emotions were significantly higher during competing episodes (trial- and competition round) compared with non-competing episodes. Anger and sadness were higher after both trial jumps and competing jumps, whereas the opposite pattern was found for fear: more fear was experienced during jumps than after jumps. The results are discussed in regard of applied implications and possible future research.

Keywords: performance, emotions, ski jumping, world cup

INTRODUCTION

Research shows that emotions are predictive of performance in sport (1, 11, 12, and 21). However, research does not give a unison answer to what emotions that help athletes to enhance their performances (18, 26, and 33). At least two types of approaches are found in sport psychology to explain how emotions help athletes to enhance their performances. The first approach is defined as hedonic emotion regulation (20). Hedonia is characterized by the presence of pleasant emotions such as joy, pleasure and happiness, and absence of emotions such as fear, sadness and nervousness (15, 20). Thus, athletes who are motivated to use this approach in their regulation of emotions work to reduce the intensity of unpleasant emotions and increase the intensity of pleasant emotions. The second approach is defined as instrumental (20). Athletes who use this approach in their regulation of emotions seek to feel emotions that they believe will help them to perform. Research has found that some athletes believe that emotions such as anxiety, fear and anger might enhance their performances, while other athletes believe that such emotions might reduce their performances (10, 12). Athletes who think that anxiety, fear and anger will enhance their performances will then up-regulate such emotions, while athletes who believe that such emotions will hamper their performances will attempt to reduce the intensity in such emotions. The interesting thing about emotions is that they directly influence the biochemical processes inside an athlete's body and therefore have the potential to influence an athlete's energy level in a moment (10). Thus, the role emotions play in association with performance is an important area in sport psychology.

The aim of this study was to explore the role of emotions for four athletes in Nordic combined during ski jumping competitions in world cup.

Emotions and performance

Authors and researchers often use the terms affect, feeling and emotion interchangeably (7, 26). However, in this study affect is defined as a "neurophysiological state consciously accessible as a simple primitive non-reflective feeling most evident in mood and emotion but always available to consciousness" (31). Thus, affect is understood as a generic term for an affective phenomenon. An athlete's subjective experience of an affect is defined as a feeling (38). Emotions are defined as complex electrochemical reactions to a specific event that occur inside an athlete's body and that lead to physiological, experiential and behavioral changes (10). It is the event, the thing or person, whether past, present, future, real, or imagined, and the athlete's perception and interpretation of this input that stimulates both the type and the strength of the emotional reaction (3, 4, 26, and 30). Thus, emotions are reactions to an event, a thing or a person, and involve a cognitive appraisal by an athlete of this event, thing or person. The work to improve and grow athletes' potential involves effortful processes and a mixture of different emotions that can both enhance or hamper their performances (8, 10, 24, and 26). Interestingly for sport psychology, research claims that different emotions play different roles in athletes' work to grow their potential in their sports (1, 11). Research also shows that different training contexts such as sport

specific core activities where athletes have the possibility to express their potential, involve different emotions that influence the regulation of behavior and performance as compared to more general activities (24).

Emotions and behavioral reactions

Elite athletes in sports naturally seek growth and development of sport specific capacities to be competitive in their sports. According to positive psychology and the Functional Well-Being Approach (FWBA), sport training that is intense and demands hard work from an athlete is found to be dominated by eudaimonic emotions such as interest and immerse (24). Eudaimonic emotions cover emotions such as interest, engagement and inspiration (24). Eudaimonic emotions are typically related to the experience of complex and demanding activities and to the striving of overcoming challenges or understanding complex meanings (9, 16, and 41). This approach is not supportive with the hedonic emotion regulation approach that is discussed in sport psychology (20). On the contrary, according to the FWBA approach easier sport trainings that require less energy and intense focus, and moments of being victorious when goals are reached, are found to be dominated by hedonic emotions such as happiness, contentment and pleasure (25). Hedonic emotions cover emotions such as pleasure, contentment and happiness (9, 16, and 41). Emotions such as happiness and pleasure are typically found to be dominant in situations that do not require too much effort and intense focus from an athlete and when an athlete experience goal achievement (24, 25, and 43). On the other hand, when athletes experience performances impairments, negative emotions such as sadness, sorrowful and depression are found to be dominant (10). Typically, sadness is triggered in relation to the task at hand when the athlete worries about not being able to perform well enough (37).

When athletes are exposed to situations that are considered novel or beyond their resources, they will experience an emotional reaction dependent on the cognitive evaluation of the situation and what the athlete can do about it (29). This is defined as the Cognitive Activation Theory of Stress (37). Performance anxiety has the potential to occur in situations where the athlete experiences expectations, internal or external, and the assessment of others is involved. Typically, guilt arises post performance in cases when the athlete feels that he or she has failed to meet the expectations or standards associated with the situation. On the other hand, athletes may experience positive emotions such as interest and inspiration when facing a difficult and novel situation (34). Inspiration is taken as a signal of appreciation and accommodation to an evocative stimulus, which usually motivates the athlete to extend the qualities exemplified in the evocative stimulus (35).

Both biologically oriented psychologists and social and personality psychology speak in favor of the proposal that hedonic and eudaimonic emotions play different roles in the regulation of sport behavior., There is an increasing agreement about the need to distinguish between hedonic feelings such as pleasure, happiness and contentment, and eudaimonic feeling states such as engagement, interest and inspiration (2, 17, 32, 36,

40, 41). The distinction might come into play by firstly triggering eudaimonic emotions such as inspiration rather than happiness to influence the training process in order to be competitive and achieve goals. Hedonic emotions such as happiness will rise and be dominating in retrospect, when the athletes look back on a task or competition well done, praising the moment of being victorious (10, 24). Negative emotions are expected to dominate situation where athletes evaluate the situation to be beyond their control and that they have inadequate coping skills, or being in the moment of failure after a task or competition not well done (10, 37). However, it is not a unison answer to how emotions play a role in relation to performance.

The present study

The purpose of the present study was to explore what emotions that dominate elite athletes who are working to grow their potential in the ski jumping part of world cup in Nordic combined. We expect that hedonic emotions will dominate during the non-competition episodes and that eudaimonic emotions will dominate during competitions. More specifically we assume that

1. Hypothesis 1: Hedonic emotions will be experienced more intensely during non-competitive episodes.
2. Hypothesis 2: Eudaimonic emotions will be experienced more intensely during competitions.
3. Hypothesis 3: Negative emotions will be experienced differently in competing as compared with non-competing episodes.
4. Hypothesis 4: Hedonic emotions will be associated with the results of the trial and competition episodes.
5. Hypothesis 5: Eudaimonic emotions will not be associated with the results of the trial and competition episodes.

METHOD

For this study, six elite athletes from the Norwegian national team in Nordic combined (all athletes on the team) were invited to voluntarily participate in the project where they were asked to document their experienced emotions during competition rounds- and after competition rounds, in ski jumping during the winter season 2015-2016. A reflection paper book was developed to document their emotional states and results in competition rounds. From these six athletes, four completed the data collection. However, not all four documented all the competitions that they completed during the season. The sample had a mean age of 24 years, ranging from 21 to 28 years.

DRM (Day Reconstruction Method)

The day reconstruction method (DRM) was developed to capture individual's feelings within everyday life (14). In this study, an adjusted and compressed version of the DRM was used. This was done to decrease the time required for the athletes to complete the registration, and thereby increase the chance that the athletes would contribute to the study in an adequate way. The athletes were asked to reflect upon their recent competition, and write reports based on three different episodes that they must complete during a ski-jump competition. First, the trial round (is ranked based on

length), thereafter the competition round (is ranked based on style and length), and lastly the period just after the competition round when the athletes are looking back on the task they have completed. The trial round and competition round are treated as competitive episodes since they both measure a ranked placement compared with the other athletes. Each episode required three types of repeated information from the athletes.

Repeated measures

According to the principles of DRM (see below), the variables examined here include items and inventories that the athletes were asked to document three times, thus for each episode. First, the athletes were asked to describe exactly what they were doing in the specific episodes through open-ended questions. Second, the athletes reported the degree of experienced feelings while completing the specific episode (emotions). Third, the athletes reported their performance in that episode (result). Each episode contains information on what exactly they were doing in the episode and based on the idea of sorting these tasks in distinct classes (14), the researchers did a qualitative interpretation of the information for each of the episodes in the investigation (135 episodes). Five different distinct classes of tasks were found: 1) Task focus just before the ski-jump (prepare focus, review of tasks, review of possible scenarios), 2) Self-contact in the moment (make contact with the mind and body in the moment), 3) Forward focus (focus ahead on what is coming next, readjust focus), 4) Evaluation (review after ski-jump, analysis of how tasks were executed), and 5) Relaxation (calm down, refocus, muscle relaxation). Thus, each of these different tasks was categorized as either one of these five categories. These task data (within-person) is nested under data at the person level (the between-person level), and is preferably examined with multilevel path analysis.

Emotions. In conjunction with each episode, the participants were asked to report the degree to which they experienced each of seven feeling states; four positive and three negative. The set of emotion items were introduced with the phrase: “During [name of the episode] I felt”: followed by the following seven items 1) satisfied/happy, 2) pleased, 3) angry, 4) sad, 5) scared, 6) interested/curious, and 7) engaged/immersed. The response options ran from 0 (no, not at all) to 6 (yes, extremely much). The seven items were supposed to be lumped into three composite scale: hedonic emotions (items 1 and 2), eudaimonic emotions (items 6 and 7), and negative emotions (items 3 to 5). The Cronbach’s alphas (α) and the average inter-item correlations (Mr) for the three composite scales were $\alpha = .91$, $Mr = .83$; $\alpha = .64$, $Mr = .48$; and $\alpha = .25$, $Mr = .14$ for the hedonic, eudaimonic and negative emotions, respectively. Due to the low reliability of the eudaimonic and negative emotion subscales, we decided to conduct our analysis on single items, using pleasure to reflect hedonic emotions, engagement to reflect eudaimonic emotions and angry, sad and scared for the negative emotions.

Performance. For each race, the athletes were asked to document their results from the competitive episodes.

RESULTS

Descriptive statistics and bivariate correlations

Table 1 gives descriptive statistics, correlation coefficients and intra class correlations (ICC) for the study variables. For the emotion variables, the ICC's were equal to or lower than .11, suggesting that the multilevel nature can be ignored for analyses of these variables. The results variable had an ICC = .32, indicating that 32% of the total variance of the athletes placing during trials and competitions is attributable to stable differences in their skill levels. With an ICC as high as this, it is not permissible to ignore the multilevel structure, hence analyses that involve the result variable will be conducted with a multilevel approach.

Table 1

Means, Standard Deviations (SD), Skewness (Skew), Intra Class Correlations (ICC) and Pearson's Correlations for the Study Variables

	1	2	3	4	5	6
1. Pleased	1.00					
2. Engaged	-.01	1.00				
3. Angry	-.47***	.12	1.00			
4. Sad	-.45***	-.14	.70***	1.00		
5. Scared	-.30***	.22**	-.12	-.16	1.00	
6. Results	-.30***	.05	.25**	.12	-.07	1.00
Mean	3.27	3.24	0.73	0.44	1.19	13.50
SD	1.30	1.31	1.40	0.96	1.40	10.03
Skew	-0.34	0.16	1.99	2.50	0.99	0.98
ICC	.09	.11	.08	.02	.04	.32

Note. N = 135. ** = $p < .01$; *** = $p < .001$.

Looking more closely into the result variables reveals some interesting differences between the four participants. For example, the first two participants had, on average, better results over the season when compared to the last two participants. When grouped together in a “Good result group” (participants 1 and 2) and a “Mixed result group” (participants 3 and 4), the difference in their results over the season was substantial, with MGood = 8.88, SDGood = 5.80 versus MMixed = 20.44, SDMixed = 11.03, giving $t(133) = -7.95$, $p < .001$. Further details about the results are provided in Table 2.

Table 2

Description of the Placing for the Four Athletes Over the Season

ID	N of events	Min	Max	Mean	SD
1	56	1	21	9.21	5.89
2	25	1	18	8.12	5.63
3	24	5	39	18.88	8.00
4	30	2	39	21.70	12.96

In order to test the first three hypotheses, which assume that the three emotional categories will operate differently across competing and non-competing episodes, we compared the means of each emotion across the here categories of episodes and tested their difference by means of an ANOVA. We did not find any significant differences in reported pleasure over the three categories of episodes, $F(2, 132) = 0.19, p = .827$, thus our first hypothesis was not supported. Participants did, however, report more intense experiences of eudaimonic emotions during the competing episodes than during the non-competing episodes $F(2, 132) = 6.99, p = .001$, in accordance with Hypothesis 2. We also observed significant differences for anger $F(2, 132) = 5.89, p = .004$; sadness $F(2, 132) = 13.67, p < .001$; and scared $F(2, 132) = 18.41, p < .001$. Hence, Hypothesis 3 was also confirmed (please cf. Figure 1 for further details).

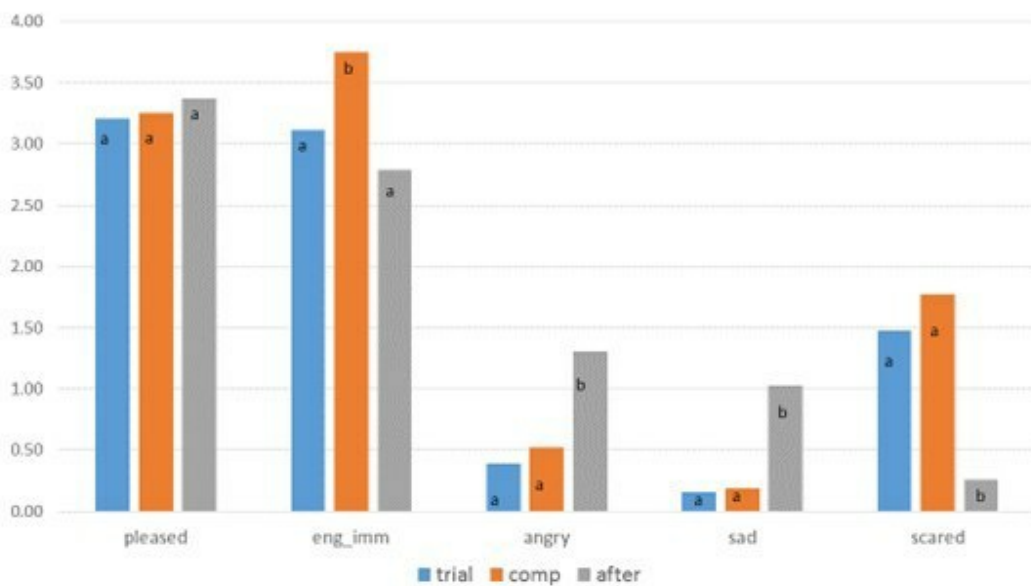


Figure 1
Emotional experiences across episodes. Within each group of emotions marked with different letters are significantly different from each other ($p < .05$, Bonferroni adjusted).

Due to the skewness in the anger and sadness variables, the ANOVA was rerun with transformed variables (obtained by replacing the values of the two variables with their square roots and giving a skewness of < 2 for both transformed variables). In terms of significant testing, only trivial differences were observed between the original variables and those run with the transformed variables.

Multilevel analysis

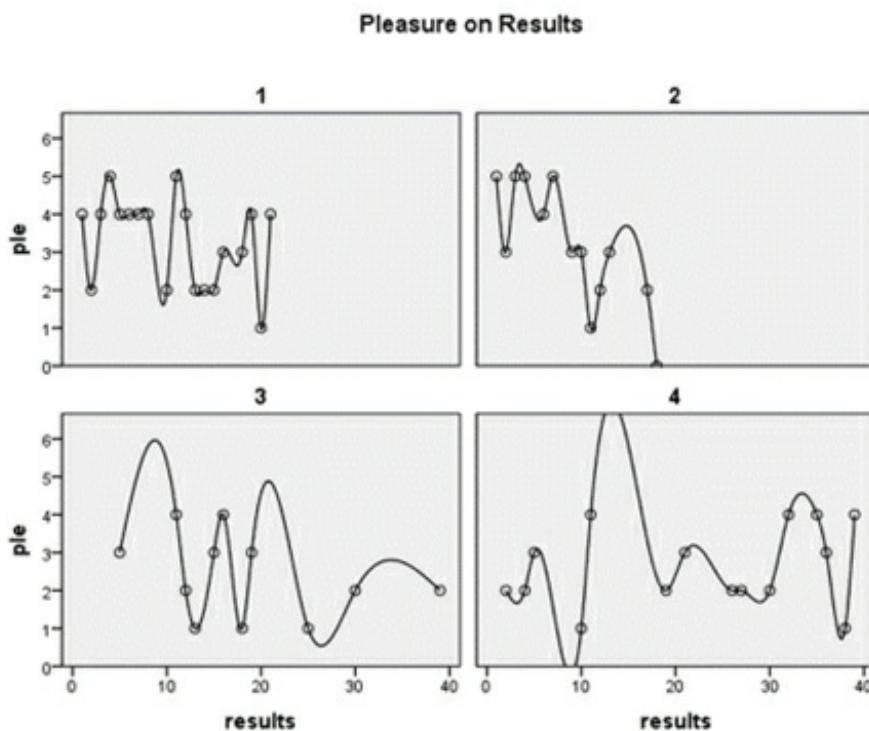
Our next two hypotheses involve the result variable and suggest that the multilevel structure of our data are taken into consideration. Accordingly, we fitted a multilevel regression analysis with hedonic emotions as the dependent variable and results and episode categories (dummy coded) as independent variables. In order to test Hypothesis 5, we fitted a multilevel regression analysis with eudaimonic emotions as the dependent variable and results and episode categories (dummy coded) as independent variables.

Table 3

Unstandardized Regression Coefficients (coef), Standard errors (SE), significance Level (p) and Lower (LCI) and Upper (UCI) Confidence Intervals (95%) for Pleasure Regressed on Results

	<i>coef</i>	<i>SE</i>	<i>p</i>	<i>LCI</i>	<i>UCI</i>
Intercept	3.83	0.25	.000	3.33	4.33
results	-0.03	0.01	.006	-0.06	-0.01
cat_t	-0.15	0.24	.533	-0.62	0.32
cat_c	-0.14	0.23	.556	-0.60	0.32

The main results of the first multilevel analysis are presented in Table 3. It shows that the results of the jumping episodes significantly predict the feelings of pleasure, and that no effects of situation categories were significant. We did not model any random effects at the between level, due to the low number of participants (i.e., between units). The random within-participant effects were modeled though, and both slopes ($\sigma^2 = 1.58$, $p < .001$) and autocorrelations ($\rho = .23$, $p = .019$) were significant at the within participant level. The within-participant results suggest that the association between results and pleasure varies across episodes, and this variation is depicted in Figure 2. Since the first to participants had better results than the two latter, their lines as shorter (stopping at about place 20, as their worst result for the season).

**Figure 2**

The variation of within-participant results of the four athletes between results and pleasure across episodes.

The next visualization shows the spaghetti plot of the four participants.

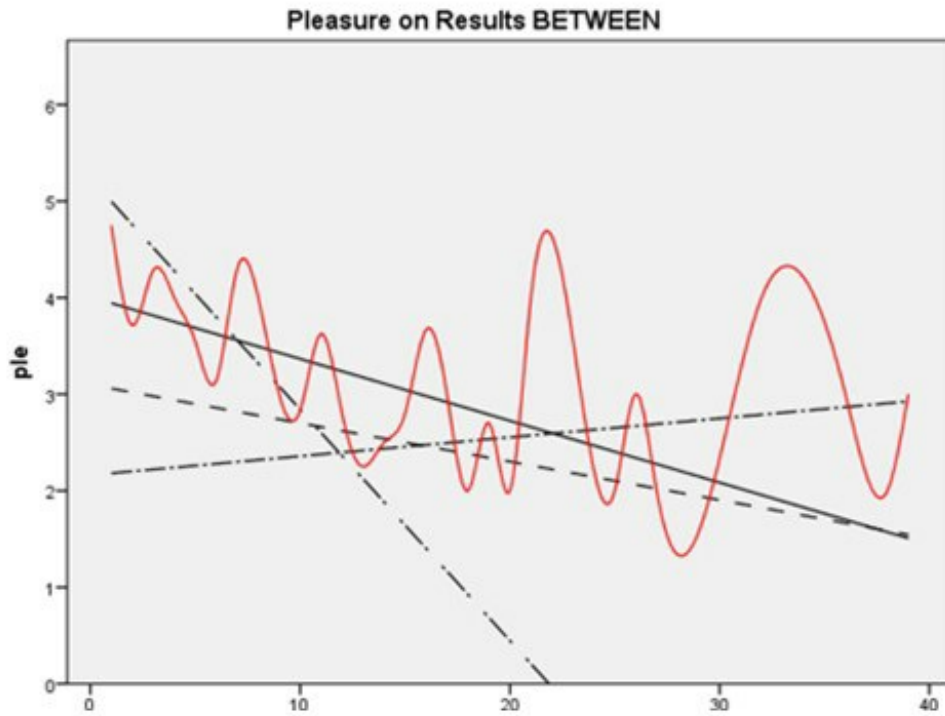


Figure 3
The association between pleasure and results of the four athletes in a Spaghetti plot.

As seen in the figure, the individual slopes indicate a general negative trend between pleasure and results, suggesting more pleasure are associated with better results (lower place number). The four participants showed different slopes, with a tendency for better athletes reporting stronger association between results and pleasure. In the multilevel analysis, this difference was not significant though, which is understandable with a sample size of 4. However, when the “Good group” and a “mixed group” (cf. the explanation above) were run in separate (one-level) regression analysis with pleasure as the dependent variable and results as the independent variable, the regression coefficient for the “Good group” was significantly higher than that of the “Mixed group” (cf. Figure 4). Although somewhat speculative, this result suggest that better athletes get more pleasure from good results than do less skillful athletes.

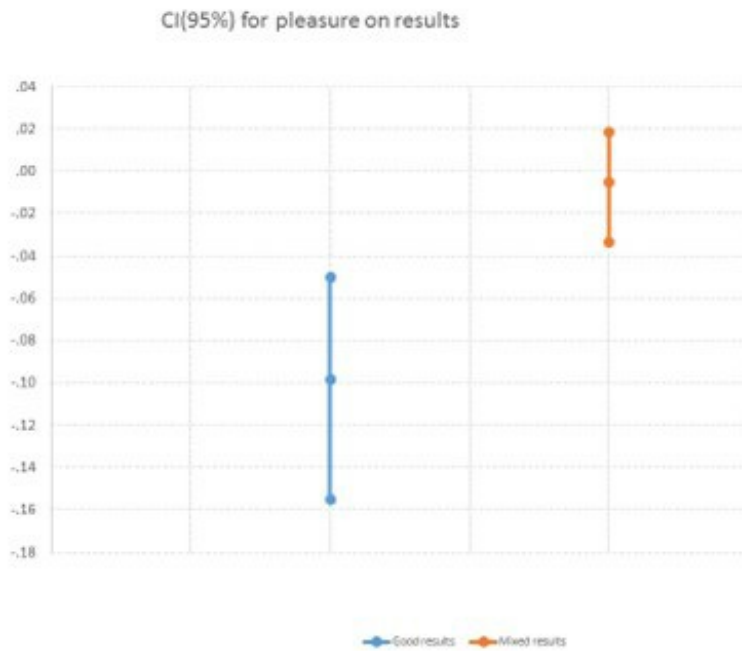


Figure 4
Regression coefficients and Confidence intervals pleasure regressed on results for "Good group" and the "Mixed group".

The main results of the second multilevel regression analysis, with engagement as the independent variable and results and the two dummy coded category variables as independent variables, are presented in Table 4. It shows that results do not predict engagement, and further that more engagement were reported during competing rounds. As was the case for the hedonic emotions, the random within-participant slopes were significant for eudaimonic emotions as well ($\sigma^2 = 1.57, p < .001$) but the autocorrelations were not significant ($\rho = .08, p = .380$). Figure 5 shows the individual slopes with no significant trend between engagement and results. The four participants showed slopes more similar to each other than were observed for pleasure.

Table 4
Unstandardized Regression Coefficients (coef), Standard errors (SE), significance Level (p) and Lower (LCI) and Upper (UCI) Confidence Intervals (95%) for Engagement Regressed on Results

	<i>coef</i>	<i>SE</i>	<i>p</i>	<i>LCI</i>	<i>UCI</i>
Intercept	2.71	0.24	.000	2.23	3.19
results	0.01	0.01	.533	-0.02	0.03
cat_t	0.29	0.26	.263	-0.22	0.81
cat_c	0.94	0.25	.000	0.44	1.44

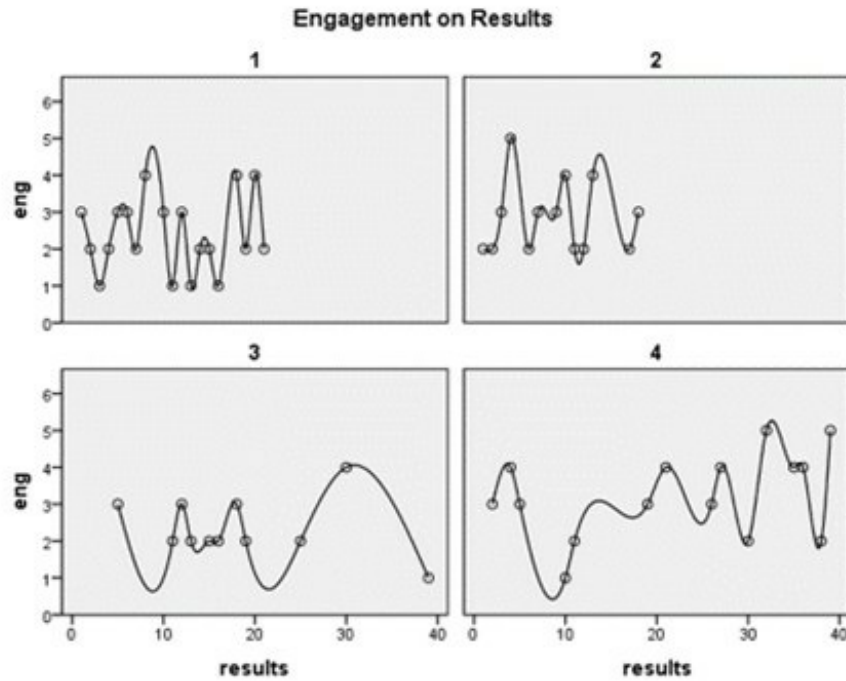


Figure 5
The variation of within-participant results of the four athletes between results and engagement across episodes.

Figure 6 shows the spaghetti plot of the four participants, illustrating that the lack of association between results and engagement is relatively stable across participants.

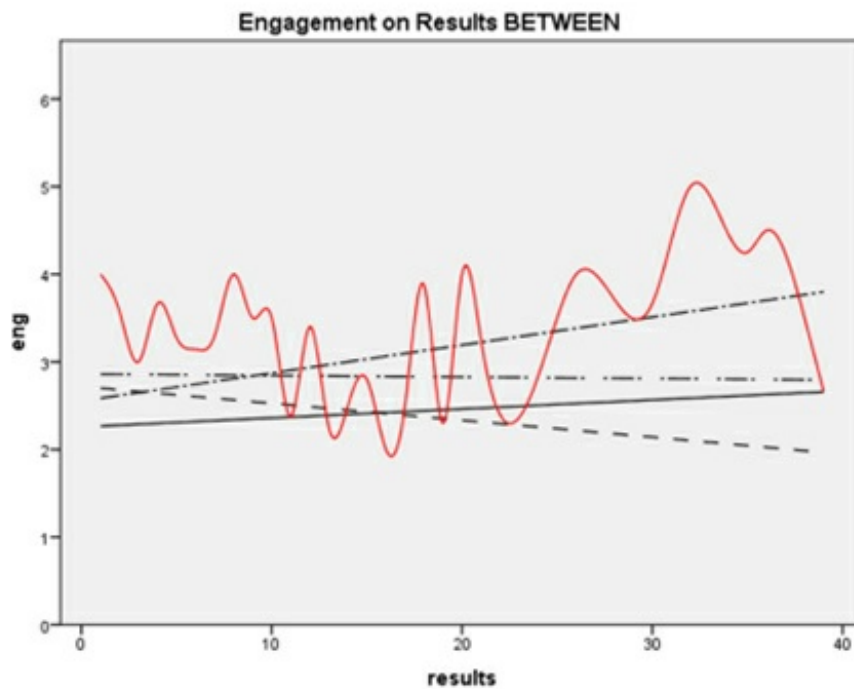


Figure 6
The association between engagement and results of the four athletes in a Spaghetti plot

DISCUSSION

The present study reports the emotions experienced by four world class Nordic combined athletes during the ski jumping trial round, ski jumping competition round and the period just after the ski jumping competition during the 2015 -2016 season. Results indicated that both hedonic and eudaimonic emotions are experienced at high

levels across all the measured episodes and that no difference between categories of jumping events. By contrast, eudaimonic emotions were significantly higher during competing episodes (trial- and competition round) compared with non-competing episodes. Anger and sadness were higher after both trial jumps and competing jumps than subsequent to the competition, whereas the opposite pattern was found for fear: more fear was experienced during jumps than after competition. Moreover, we detected a significant association between hedonic emotions and the results from trial and competition episodes, but no association with eudaimonic emotions and these results. Finally, we observed a tendency for better athletes to report a stronger association between hedonic emotions and results than did less successful athletes.

The role of hedonic emotions

The first hypothesis predicted that hedonic emotions would be experienced more intensely during non-competitive episodes. The results in this study show that hedonic emotions are experienced at high levels across all the measured episodes, and that no difference between categories of jumping events was observed. Thus, the first hypothesis was rejected. A possible explanation to this might be that athletes' goals are arranged hierarchically, and that the stronger and more important the goal is, the more intense is also the emotional response (13). For the athletes in this study, world cup competitions normally represent goals at the top of their hierarchy, and therefore these events are the most important ones for these athletes. Thus, the athletes are pleased to have the opportunity to do what they have worked for during so many training sessions. Another explanation might be linked to the fact that ski jumping is considered a potentially dangerous sport, sharing similarities with typical "extreme sports". Research on extreme sport athletes shows that taking part in extreme sports activities permit the athletes to experience their own existence in novel ways (e.g. the experience of 'flow'), and offer the athletes a way of extending their range of experience in order to make available new and potentially enriching ways of being (42). Competitive sport in itself might represent such an arena for competitive athletes. Such a unique arena should normally represent highlights for the athletes, and hedonic emotions such as pleasure should therefore be a naturally response. Based on the findings in this study, the hedonic emotion regulation strategy in sport psychology seems to be a strategy that the athletes in this study use (20).

The fourth hypothesis predicted that hedonic emotions would be associated with the results of the competitive episodes (the trial round and competition round). The findings in this study confirm this, as significant association between hedonic emotions and the results from trial and competition episodes were found. The hedonic emotion regulation strategy might also be a possible explanation for these results. In competitive situations, athletes are driven by a paradox combination of hope of success and fear of failure (4, 6, and 23). Hope of success stimulates pleasure while fear of success stimulates negative emotions such as fear, sadness and nervousness (21). Thus, the hedonic emotion regulation strategy might be essential to stimulate positive emotions instead of negative emotions in competitive settings. Interestingly, this study shows a tendency for athletes performing better in competitive episodes to report a stronger

association between hedonic emotions and results. This might be because the actual performance of the competitive episodes provides pleasure as an immediate response during performance, as the athletes might feel that they manage their tasks and brought out their potential in that actual moment (26). However, when the athletes compare their performance against others and reflect on their actual result, the emotional response might be other vice.

The role of eudaimonic emotions

The second hypothesis predicted that eudaimonic emotions would be experienced more intensively during competitive episodes. The findings in this study confirm this, as eudaimonic emotions were significantly higher during competing episodes (trial round and competition round) compared with non-competing episodes. Competitions represent the opportunity for athletes to “show” their skills and abilities, and compare themselves with other athletes. Competitions represent “core activities” for competitive athletes, and core activities are found to be the type of activity where athletes have the possibility to show their full potential (24). The high level of eudaimonic emotions such as engagement and immersion in the competitive episodes could reflect the fact that performing in competitions are the reason why the athletes invest high amounts of efforts in their sport.

Another possible explanation to this finding can be found in the arguments used to explain the role of hedonic emotions above. Competitions are for competitive athletes top prioritized in their hierarchy of goals. At the same time, the competitive situation is a paradoxical mix of hope and fear. Thus, competitive athletes expose themselves to certain risks to harm their hope for future success by entering competitive situations and experience possible failures, whereas they also might strengthen their hope for future success by experiencing success. The work to handle this paradoxical mixture might stimulate eudaimonic emotions such as engagement and immersion.

The fifth hypothesis predicts that eudaimonic emotions would not be associated with the results of the competitive episodes. The findings in this study do not confirm this, as eudaimonic emotions are found to be significant after competitive episodes. A possible explanation to this finding is that the athletes are engaged in analyzing their results and are working interestingly and engaged to find possible cause and effect relationships regarding their performance (27).

The role of negative emotions

The third hypothesis predicts that negative emotions will be experienced differently in competitive episodes as compared with the non-competitive episodes. The findings in this study confirm this, as angry and sad are significantly higher in non-competitive episodes as compared with the competitive episodes, and scared are significantly higher in competitive episodes as compared with non-competitive episodes. This can be explained with the occurrence of negative emotions after competitive situations where the athletes have not achieved their goals, and are looking back on task that they did not complete at their highest standards. An earlier study claims that anger and sadness can be considered as “post-performance emotions”, as a performer may feel angry to have

performed below own potential or sad to have failed own expectations or the expectations of others (44). Interestingly, this study also found a significant positive association between anger and results, showing that higher levels of anger are negative for their results. Ski jumping is a highly technical sport and in order to fulfil technical potential athletes need to be relaxed and calm (22). This might serve as an explanation to the finding that anger seems to be negative for ski jumping results. The results in this study also show that fear was experienced higher during competitive episodes than after. Ski jumping is considered an extreme sport, and research claims that athletes refer to intense emotional experiences, such as fear in such situations (42).

The present study has several limitations. First, the study is only investigating four athletes. Further, in order to report a precise emotional state through a self-reporting system, athletes need to have developed their emotional awareness. In a comprehensive review of the area, Vallerand and Blanchard (38) noted that emotions comprise three main elements: physiological changes, subjective experience, and action tendencies. There is no validation of the athletes' subjective experience in this study. Furthermore, emotions are present in the moment, and should therefore optimally be reported directly when they are accessible (29). In this study athletes reported their emotions while looking back at the trial round, the competition jump and their reactions just after the results were clear. Future studies should consider these notes.

CONCLUSION

Previous research on emotions in sport does not give a unison answer to what emotions that might help athletes to enhance their performances. This study indicates that it is no unison answer to this question in the context of ski jumping, as no clear relationship between emotions and results were found. However, the results in this study show that both hedonic emotions, such as pleasure, and eudaimonic emotions, such as engagement, seems to play an important role in athletes' struggle to perform at their best, whereas these emotions were experienced at high levels across all episodes. Importantly, all these athletes are competitive at international levels in their sport. Negative emotions such as angry and sad were experienced at low levels in competitive episodes, and higher levels after competitive episodes, when athletes look back on the tasks they have completed and the result they have achieved. Scared is experienced at medium levels in competitive episodes and low levels in non-competitive episodes.

APPLICATIONS IN SPORT

Emotions in sport have the potential to influence performance both positively and negatively. Athletes would be more competitive if they learned how their emotions affected their performance and how they can use emotions to enhance their performances. This study shows that high levels of both hedonic- and eudaimonic emotions might be related to performance, while negative emotions such as sad and angry optimally should be at low levels. The results also indicate that it is necessary to accept negative emotions, such as being scared, during competitive episodes.

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