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Title:

The associations between motivational climate, basic psychological needs and dropout in
volleyball – a comparison across competitive levels

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Abstract

The purpose of this study was to investigate the importance of motivational climate for the satisfaction of psychological needs and dropout in recreational, intermediate and elite volleyball. 7936 volleyball players from all 321 volleyball clubs across Denmark were invited to participate in the study. 3330 answered the questionnaire and 2150 were included in the analysis. Dropout from Volleyball was measured as the proportion of players that had stopped playing volleyball over the last year. The coach-created motivational climate was measured using the Motivational Climate Scale for Youth Sports. The satisfaction of players' psychological needs was measured using an adapted version of the basic psychological needs in exercise scale. The psychometric scales were validated and showed good model fit. For volleyball players of all levels, the degree of mastery climate predicted the satisfaction of the players' basic psychological needs satisfaction during volleyball which was in turn associated with lower dropout rates. Performance climate had a weak negative association with the satisfaction of psychological needs on the intermediate level only. When adjusting the models for the negative association between performance climate and mastery climate this negative association became nonsignificant and a weak positive association to needs satisfaction emerged for players at the elite level. Findings confirm that the coach-created mastery climate in volleyball teams is important for the satisfaction of players' basic psychological needs and continuation within the sport across the recreational, intermediate and elite levels.

Keywords: Task climate, ego climate, adherence, continuation, enjoyment, well-being, Motivation.

Highlights:

- Coach-created mastery climate in volleyball teams was positively associated with the satisfaction of the players' basic psychological and negatively associated with dropout.
- These associations between coach created climate, need satisfaction and dropout were similar across different sporting levels.
- Performance orientation had little influence and seemed mainly problematic if it was at the expense of mastery climate.

Introduction

In Denmark, the national health body view club based sport as an important means for promoting physical activity and health in the population as well as social cohesion of communities ¹. There is a high participation rate in sport among Danish children of almost 80% ², but drop-out rates from club sports are high worldwide in adolescents and adults ³ and Denmark is no different. In 2016, a national large scale survey showed that club based sport participation amongst 7-15 year olds were 88-80%, 53 % amongst 16-19 year olds and 35-37 % amongst 20-59 year olds, and very similar trends were seen in 2007 and 2011 ⁴. In order to reverse this trend, further research is required to identify the factors that determine continuation (versus drop-out) in club-based sport.

One group of psychological factors that have shown promise in predicting dropout of sport are basic psychological needs satisfaction which are described in self-determination theory (SDT) and in the SDT mini theory basic psychological needs theory (BPNT) more specifically ^{5,6}. According to BPNT all human beings have three basic psychological needs that are important for optimal feelings of wellbeing and autonomous motivation (especially intrinsic motivation but also integrated and identified regulation) in an activity ⁷. These are the needs to experience autonomy, competence and relatedness. In activities where the need for autonomy is fulfilled, individuals will experience their feelings, actions and thoughts as stemming from their own volition and choice. When the need for relatedness is fulfilled, individuals will feel connected with and accepted by significant others and a sense of belonging. When the need for competence is fulfilled, individuals feel they are capable and able to overcome the challenges necessary to succeed in an activity ^{7,8}. Previous research has confirmed that when a person participates in an activity that satisfies the three basic psychological needs, the individual will

experience well-being, enjoyment and develop autonomous motivation for the activity, and are thus more likely to continue participating⁸. In sport, for example, a study of youth soccer teams from five different European countries demonstrated that basic psychological needs satisfaction during soccer was positively related to enjoyment and negatively related to intentions to drop out⁹. BPNT also assumes that the sporting environment created by significant others influences the extent to which an athlete's three basic psychological needs are satisfied with especially autonomy support being important^{10,11}. One facet of the sporting climate that is important for participants' psychological needs satisfaction in the sport is the coach-created motivational climate¹². However, another central dimension describing the coach created social environment within sports is to what extent the focus and success criteria is mainly performance compared to others or mastery of the technical, tactical and physical tasks of the sport as described in achievement goal theory^{13,14}. The extent central persons in the environment emphasise these two different success-criteria may hold important implications for the participants psychological needs satisfaction and hence their well-being and motivation in the sport.

Mastery climate (sometimes also called task climate) has shown to be positively associated with intention to continue in sport among male sport active adolescents¹⁵ and young female handball players¹⁶ and it has been associated with continuation among young elite judokas^{17,18}. Whereas performance climate (sometimes also called ego-involving climate) has been associated with intention to dropout in young female handball players¹⁶. Research with Portuguese adults (18-64) has also confirmed a positive association between exercisers' perceptions of a task involving climate and psychological needs satisfaction which in turn was associated with exercise adherence¹⁹

In a mastery climate, the focus, or achievement goal, is the mastery of the tasks of the sport. This means that the development of skills for the technical, tactical and physical tasks of the sport are seen, encouraged and articulated as main goals and success criteria adopted by the coach. This focus is very similar to SDT's description of intrinsically motivated engagement in activities (such as sport) as a drive towards developing skills, facing challenges and taking on new activities without external reinforcement from the environment¹². However, as also described in SDT, sustaining this type of motivation for an activity is dependent on having one's needs for experiencing autonomy, competence and relatedness satisfied during the activity¹². As the criteria for success/competence in a mastery climate are not mainly based on the extrinsic aims of achieving more points and higher ranking than others, but on the effort put into solving the activity specific tasks, the experiences of competence can occur more often and for more participants than only when winning and outperforming others. Moreover, in a mastery climate, coaching involves emphasising the importance of the participants' and the team's cooperative learning, effort and improvement and that everyone has an important role²⁰. Such emphasis on personal development, cooperative learning and interdependence instead of internal competition may also promote participants' experiences of relatedness and autonomy. In a performance climate, in contrast, athletes are punished by the coach if they make a mistake, and the coach only recognises and supports the most able performers and encourages rivalry between teammates²⁰. Such controlling use of reward and punishment is likely to diminish participants' experiences of autonomy and relatedness and only foster experiences of competence for the ones performing better than others¹⁵.

Empirically it has been confirmed that a mastery climate is a positive predictor of the fulfilment of the basic psychological needs in sport²¹. This has been shown with young soccer

players²², elite dancers^{23,24}, elite orienteering athletes²⁵, swimmers²⁶ handball players¹⁶ and young athletes²⁷. In contrast, it has been found that performance climates can lead to lack of psychological needs satisfaction and drop-out in a study of young female handball players¹⁶.

Another assumption in BPNT is that psychological needs satisfaction mediates the relationship between contextual factors, such as the climate dimensions proposed by AGT, and behavior, such as drop-out or continuation. The few studies in sport that have investigated the extent to which basic psychological needs satisfaction mediate the relationship between the climate dimensions proposed by AGT and athletes' drop-out²³ or intentions to dropout,^{25,26} have found support for the mediating role of needs. These studies have involved adolescent female handball players (age 13-15)²³, 16-17-year-old male and female elite handball players²⁵ and 12-16-year-old male soccer players. As all these studies involve youth populations it is important to confirm whether the associations are also seen among adult sports participants. Furthermore, most of these studies use participants' intentions to drop-out as a proxy measure of drop-out. As described in reasoned action approach behavioral intentions is a proximal predictor of behaviour, however it has been shown empirically that they are not strong predictors of actual behaviour³⁰. Therefore, it is important to supplement the above-mentioned studies with large studies using measures of actual drop-out behaviour.

An additional assumption within BPNT is the universality hypothesis that suggests psychological needs are essential for optimal human functioning and well-being for all individuals^{7,31}. Previous research has confirmed the universal role of psychological needs satisfaction for the promotion of optimal human functioning and well-being across different life domains³² as well as in different circumstances within those contexts⁹, cultures/countries^{9,33}, and across age, gender, and socioeconomic status³⁴. Moreover, as outlined above, research has

also confirmed the universal benefits of mastery coach-created motivational climate for the satisfaction of sport participants' basic psychological needs. However, despite considerable evidence in sport contexts regarding basic psychological need theory, research has been limited in determining the extent to which the proposed relationships between climate dimension from AGT, basic psychological needs and drop-out of sport are "universal" across competitive levels.

Based on key constructs and assumptions within BPNT, the purpose of this study was to test the extent to which athletes' satisfaction of their psychological needs in the volleyball environment mediated the relationship between dimensions of the coach-created motivational climate proposed by AGT and dropout from club based volleyball. An additional purpose was to examine the extent to which the hypothesised relationships and mediating role of basic psychological needs were similar across volleyball players from three competitive levels (recreational, intermediate and elite) and for both youth and adult players.

The study's hypotheses are that:

1. Satisfaction of the basic psychological needs is negatively associated with dropout rates.
2. Coach-created mastery climate in volleyball is positively associated with basic needs satisfaction and negatively associated with dropout rates.
3. Coach-created mastery climate is negatively associated with dropout mediated by higher needs satisfaction.
4. Coach-created performance climate is negatively associated with psychological needs satisfaction and positively related to dropout rates.
5. The association between performance climate and dropout is mediated by low needs satisfaction.

6. There will be no differences in the hypothesized associations and mediating associations across the 3 competitive levels.

Materials and Methods

Participants and Procedure

In Denmark, as in other Scandinavian countries, most leisure-time recreational and competitive sport is organised in clubs that are part of a larger national sport organisation. This is also the case for volleyball. The Danish volleyball association has 321 clubs with about 15440 members. All young and adult volleyball players (age 16-60 years) that were registered as playing volleyball in a club in the Danish volleyball association in the previous season (i.e. 2015, one year previous to the study) were invited to participate in the study and sent a personal link to a questionnaire (n=7936) via personal email. The questionnaire combined previously validated instruments into a total of 98 questions, which took on average 11 minutes to answer. A total of 3330 current and previous players answered the questionnaire. Of these, 2150 had a coach and had also completed the scales used in this study, and were therefore included in the analysis.

The included participants were 2150 Danish volleyball players, of which 1107 (51.5%) were female and 1038 (48.3%) were male. Five (0.2 %) did not declare their gender. The participants had a mean age of 33.70 years (SD = 11.87, range 16-60). Eight-hundred-fifty-six players were in the youth age group 16-24 years and 1294 were adults over 24 years of age. Nine-hundred-and-one (43.3%) played at recreational level, 771 (35.9%) played at intermediate level, and 448 (20.8%) played at elite level (see measures section for definitions of competitive levels). Six-hundred-and-eighteen (28.7 %) players had stopped playing volleyball within the previous year (see measures section for measurement of drop-out).

Measures

Sporting level

Players' sporting level was self-reported with players reporting the league they (and their team) mainly play in currently or when they were last playing. These leagues were coded into three sporting levels. Playing in the national leagues 1, 2 and 3rd division was categorised as playing at the elite level. Playing in leagues that covered larger regions in Denmark was categorised as intermediate level. Teams that only played matches locally, or in recreational tournaments for fun, or did not play matches with other teams at all were categorized as recreational level.

Age groups

Participants aged 16 to 24 years were categorised as youth in accordance with the WHO/UNICEF/UNESCO/UN definition ³⁵. Participants aged 25 + were categorized as adults. This youth age category also corresponds well with the Danish context, in which most individuals are still studying or taking part in education, and few have yet become parents. From age 25, it is more common to have started a career and a family ³⁶.

Dropout

In order to determine dropout within the last year, players were asked if they played volleyball during the previous season (one year ago) and if they were still playing this season. The following two questions with "yes" or "no" as possible answers were used:

"Did you play volleyball in a club or association last volleyball season (the season 2014-2015)?"

"Are you playing volleyball in a club or association this volleyball season (the season 2015-2016)?"

Six-hundred-and-eighteen of the 2150 (28.7 %) that played volleyball in a club last season reported that they no longer played volleyball in a club this season, i.e. had dropped out within the last year. The remaining 72.3% were still playing volleyball in a club. The players that had stopped playing were asked to answer the psychometric questions with reference to how it was when they used to play (i.e. last season).

Perceived motivational climate

The perceived motivational climate was measured using a Danish translation of the validated English version of the Motivational Climate Scale for Youth Sports (MCSYS)³⁷. MCSYS is a scale developed for youth, and was chosen for this study to ensure that the youngest participants understood the items. However, because our sample also included adults, the factorial validity of the MCSYS was tested before the main analysis. MCSYS measures the degree of coach-initiated mastery and performance climate in sport using 12 items³⁷. Each item is scored on a five-point likert scale ranging from 1= “I don’t agree at all” to 5=“I agree completely”. With this instrument, aspects of a mastery motivational climate, such as focus on cooperative learning (e.g. “The coach told players to help each other get better”), effort/improvement (e.g. “The coach made players feel good when they improved a skill”), and all players having important roles (e.g. “The coach said that all of us were important to the team’s success”) are measured. Similarly, aspects of a performance motivational climate, such as intra-team member rivalry (e.g. “The coach told us to try to be better than our teammates”), unequal recognition (e.g. “The coach paid most attention to the best players”), and punishment for mistakes (e.g. “Players were taken out of games if they made a mistake”) are measured³⁷. The MCSYS has been validated and has shown acceptable reliability and strong factorial validity among different samples of 9-16 year old athletes³⁷.

Satisfaction of psychological needs

Players' self-reported psychological need satisfaction during participation in volleyball was measured using a Danish translation of the validated English version of the Basic Psychological Needs in Exercise Scale (BPNES)³⁸. BPNES is an instrument designed to assess the satisfaction of the three psychological needs of autonomy, competence, and relatedness in the contexts of exercise. The scale was also context adapted so that it asked about volleyball participation instead of exercise in general. The scale consists of 11 items: 4 for autonomy (e.g., "I feel that the way I participate in volleyball is the way I want to"), 4 for competence (e.g., "I feel volleyball is an activity in which I do very well") and 3 for relatedness (eg., "I feel I have excellent communication with the people I play volleyball with"). Each item is scored on a 5-point scale ranging from "I don't agree at all" to "I agree completely".

Both MCSYS and BPNES were translated into Danish using a translation / back translation process³⁹.

Statistical approach

Psychometric properties of the included measures

Prior to analysis, the following psychometric properties were inspected. The validity of the participants' responses on the employed scales were estimated by conducting exploratory structural equation modelling (ESEM) analysis on each questionnaire^{40,41}. Cross loading and model fit were inspected. Loadings above .3 on intended factor and below .3 on unintended factors were considered acceptable⁴². The following criteria for a good model fit were used: $\text{Chi}^2/\text{df} < 5.00$, $\text{CFI} > .95$, $\text{TLI} > .95$, $\text{RMSEA} < .06$ ⁴³. To estimate the reliability of the employed scales, Cronbach alpha values were calculated and values above .7 were considered acceptable^{44,45}. Reliability analyses were conducted with SPSS and ESEM with Mplus⁴⁶.

Association of the study variables

Structural equation modeling (SEM) was used to investigate the mediating role of psychological needs satisfaction in the association between perceived motivational climate and drop-out in volleyball. This was done in two steps: by modelling mastery and performance climate dimensions separately in two different models, and then in the same model. This approach was adopted in order to determine the association of each climate dimension individually with the other variables and when the association of the other climate dimension was adjusted for. Both steps were done first with all volleyball players, and second with their sporting level as grouping variable. SEM analyses were also done in Mplus. Inspection of modification indices were done in order to ensure that only models with approaching acceptable model fit were analysed⁴³. When model fit did not meet fit criteria, items within the scales were allowed to correlate beginning with the items that were theoretically most alike (e.g. the items within relatedness, within the scale measuring basic psychological need satisfaction). All SEM models were done on the entire sample as well as separately for the youth and adult population.

Results

Psychometric properties of the study measures

ESEM analysis of the BPNES with distinct factors for each of the three needs showed that there were significant issues with autonomy scale where one item had very weak loadings on intended factor (local:.054; regional:-.054; national: .018) and high cross loading with competence (local:.336; regional:.546; national: .490). Another autonomy item also showed problems with low loadings on the intended factor (regional:.163; national: -.155). One item in the competence scale had cross loading with autonomy (Regional:.354; National:.321). The model fit, however, met the criteria for a good model fit (RMSEA = .067 (90% CI .061 - .074);

CFI = .983; TLI = .963; SRMR = .019). Because of the issues with cross loadings the analyses was done with items measuring satisfaction of all three basic psychological needs as one latent factor.

ESEM analysis of the MCSYS showed no issues of loadings on intended factors or cross loadings between mastery and performance climate dimensions. The model fit indices also met criteria for a good model fit (RMSEA = .050 (90% CI .049 - .059); CFI = .989; TLI = .977; SRMR = .012).

Mean, standard deviations and Cronbach alpha statistics of the study measures are shown in table 1. The alpha for the performance dimension scale was just below the cut-off criteria of .7. However, deleting any of the performance climate items would not improve the scale's internal consistency. It was decided to proceed with the subsequent analysis with this scale. No items or scales had problematic skewness or kurtosis values.

INSERT TABLE 1 HERE

Structural Equation Modelling

Inspection of modification indices revealed that it would significantly improve model fit letting the error terms between the items within basic psychological need satisfaction correlate. All three relatedness items were allowed to correlate with each other, two autonomy items (of four) were allowed to correlate and one competence item were allowed to correlate with two other item competence items. For the mastery climate dimension, a strong significant positive association was observed to needs satisfaction for the total sample, in both age groups and for the three sporting levels. No significant association between the performance climate dimension and basic psychological need satisfaction was found for the total sample. However, for the intermediate level sample, a weak negative association was found. Basic psychological needs

satisfaction was significantly negatively associated with dropout in both models, for all players and on all sporting levels. The same pattern was observed for the adult population with the exception that no association between basic psychological needs satisfaction and dropout was observed in the elite adult population. In the young age group, however a negative association between performance climate and basic psychological needs satisfaction was observed on all three sporting levels. Overall, the associations between study variables were stronger for the young population compared to the adult population (see fig. 1).

INSERT FIGURE 1 HERE.

In figure 2 the results of the overall influence of the two motivational climate dimensions on basic needs satisfaction adjusting for association from the other climate dimension are shown as well as the association from needs satisfaction to dropout. The analysis done on the entire sample revealed a strong significant positive association between the mastery climate dimension and the satisfaction of the psychological needs (.619, $p < .001$) and a weak but significant positive association between performance dimension and the satisfaction of needs (.091, $p = .001$). A negative association between the satisfaction the psychological needs and dropout was observed (-.177, $p < .001$). The final model fit indices for the overall model were as follows RMSEA = .051 (90% CI .048 - .053); CFI = .91; TLI = .90; SRMR = .051. In figure 2 the results of the influence of the perceived motivational climate through basic needs are also shown separate for each sporting level. On all three sporting levels a strong significant positive association between mastery dimension and the satisfaction of the psychological needs was observed (recreational: .611, $p < .001$; intermediate: .574, $p < .001$; elite: .688, $p < .001$). No significant association between performance climate and the satisfaction of the psychological needs were observed on the recreational and intermediate level. However, on the elite level a weak positive

association between performance climate and needs satisfaction was observed (.212, $p=.009$). On all three competitive levels, a negative association between the satisfaction the psychological needs and dropout was observed (recreational: $-.181$, $p<.001$; intermediate: $-.193$, $p<.001$; elite: $-.156$, $p=.006$). The model fit when introducing sporting level as grouping variable were as follows RMSEA = .054 (90% CI .051 - .057); CFI = .88; TLI = .88; SRMR = .066). The association pattern was similar for both age groups, however as with the separate models, the associations were generally stronger for the young population. One noteworthy observation was that no association between psychological need satisfaction and dropout was observed for adult elite players.

INSERT FIGURE 2 HERE.

The mediating unadjusted and adjusted effects from the motivational climate dimensions to dropout through the needs satisfaction can be seen in table 2. A significant mediating effect is observed for the mastery climate dimension to dropout for all sporting levels combined and on all three sporting levels individually both unadjusted and adjusted for the level of performance climate. For the performance climate dimension, only two very weak significant mediation paths were observed. When not adjusting for mastery climate, a weak positive effect was observed at the intermediate level (0.039 , $p=0.004$). For all other performance dimension paths, the mediation were weak and nonsignificant. Even though significant for both age groups, the mediations of a mastery performance climate through basic psychological needs satisfaction to dropout was stronger for the young population compared to the adult population on all levels.

INSERT TABLE 2 HERE

Discussion

In this study the coach-created mastery climate was positively associated with the satisfaction of volleyball players' basic psychological needs which in turn were negatively associated with dropout from the sport. These associations were very similar on the recreational, intermediate and elite level, however for adults on the elite level no association between basic psychological needs satisfaction and dropout was observed. When psychological need satisfaction was included as a mediator, the associations observed in this study between perceived mastery-oriented motivational climate and lower dropout rates was found through needs satisfaction. The role of performance climate was less strong and less clear. For the young volleyball players, performance climate was negatively associated with needs satisfaction on all levels, were as for adults this was only be shown on intermediate level. When adjusting for the negative association between performance climate and mastery climate, the associations between performance climate and needs satisfaction were no longer negative, and for some subgroups even became weakly positive i.e. intermediate youth and elite adults.

As described above, other studies have also shown the importance of satisfying psychological needs for intentions to continue in sport⁹. Our study builds upon previous evidence by demonstrating that psychological needs satisfaction is negatively associated with dropout from sport. The results of this study are also in line with other studies that have shown that mastery motivational climate is associated with psychological needs satisfaction among participants²². This study provides initial evidence showing that the associations between coach-created mastery climate and the satisfaction of basic psychological needs and dropout are very similar on the recreational, intermediate and elite level, offering further support for the universality assumption in BPNT. This implies that regardless of the competitive level, the

creation of a mastery climate may have benefits for athletes' psychological needs satisfaction, which in turn may contribute to lowering dropout in the sport.

The findings that performance climate was negatively associated with needs satisfaction for the young volleyball players and for the adult players on intermediate level, also mirror other studies in the area. It has been found that performance climate is associated with lower psychological needs satisfaction, less self-determined motivation and dropout, among adolescent athletes¹⁶. However, other studies have observed no association between performance climate and satisfaction of the psychological needs when adjusting for mastery climate^{28,29}. One study even found a positive association between performance climate and aspects of athletic engagement⁴⁷. Our and earlier findings thus underline the complexity in understanding how a performance climate is associated with dropout and under what conditions.

In this study performance climate was negatively associated with mastery climate. When adjusting for this negative association, performance climate had no or weak positive association to needs satisfaction. In other words, performance climate only or mainly seems to hinder the satisfaction of players' psychological needs when it is at the expense of mastery climate. This is an important finding in the sport world, where the focus on winning, competition and ranking is often described as the very ethos of modern sport culture⁴⁸. The performance climate, in which only winners are applauded, does not satisfy the need for competence in everyone (especially not when losing), and when the coach is only performance oriented, will probably not satisfy the need for relatedness and autonomy through coach-athlete interaction. However, the mastery climate will likely support satisfaction of the basic needs for competence, relatedness and autonomy through appreciation of players' personal development, effort and contribution to the team. In practical terms, this means that the negative consequences of a performance climate can

be counteracted by supplementing this focus with a focus on development, effort and corporation as well. To our knowledge, this is the first study investigating the associations between motivational climate, needs satisfaction and dropout from sport among adults. When comparing the associations among the adult and the youth, the overall tendencies are similar, but the associations are stronger for the younger players. In this way the results for the adult population is in line with what has been found within youth-sport^{15-18,28,29} and in an exercise context for adults¹⁹. However, the subgroup of adults playing at the elite level differed from the other groups as no associations between needs satisfaction and dropout was found for this group. This surprising finding needs to be confirmed and investigated in more detail in future studies.

Strengths and limitations of the study

A strength of this study is that it builds on a large sample of volleyball players from all clubs in Denmark, from all levels of playing and from both genders. Another strength is that a measure of actual dropout from the sport is obtained. Many studies with this sample size only include measures of intention^{16,28,29}.

A potential weakness is that dropout is only measured over a one-year period. While this period will likely find most dropouts, it may be that some players continue for more than a year even if their intrinsic motivation has declined. It may also be that some of the dropouts are explained by other constraining factors such as injury or moving house and may return to the sport later, however such external factors do not seem associated with the motivational climate and should hence not be confounding the association between motivational climate and continuation. It is possible that players dropping out from club volleyball continue playing volleyball in other more self-organized environments. It was indeed the intention to study the association between coach created motivational climate in club sport and drop out from club

sport. Another limitation is that, players who had dropped out were reporting on their recollection of the motivational climate, psychological needs satisfaction from up to one year ago, introducing a recall bias in their answers.

It might also be a limitation that the measure for motivational climate was based on a measure developed and tested on youth as a large part of the sample were adults. A more appropriate measure might have been the PMCSQ-2, which has since been validated on both youth and adults²⁰. It is also a limitation that the players' basic psychological needs satisfaction was based on a measure directed at exercise in general and not on a more sport specific measure. This choice of scale might be the reason for not being able to model the relationships between each of the basic needs satisfactions, motivational climate and dropout. A more appropriate measure might have been the PNSS-S, which also measures needs frustration⁴⁹. Performance climate might have a stronger association with needs frustrations than with just low needs satisfaction⁴⁹. Therefore, future studies should study this association in longitudinal cohort study.

Conclusion

Across both the recreational, intermediate and elite level coach-created mastery climate in volleyball is positively associated with how much the players' basic psychological needs are satisfied which in turn decreases the likelihood for dropout from the sport. Performance orientation has little influence and seems mainly problematic if it is at the expense of mastery climate.

Declarations

Availability of data and material

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Ethics approval and consent to participate

The survey was carried out in accordance with relevant guidelines and regulations. All participants were informed that the questionnaire was anonymous and voluntary. The Danish Data Protection Agency regulations was adhered to. Institutional ethical approval is not required for anonymous data in social science research in Denmark, no approval was obtained.

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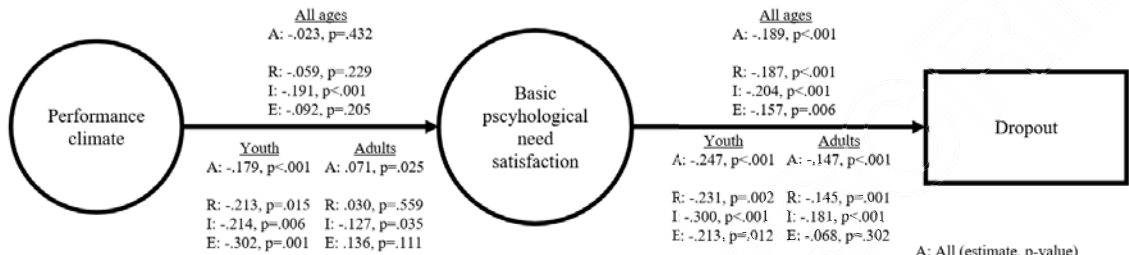
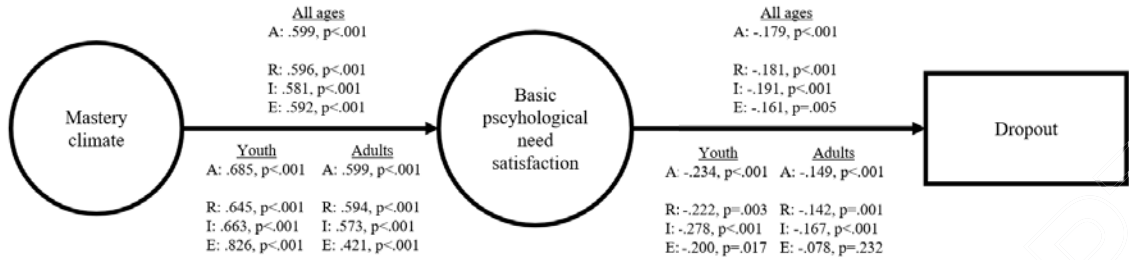
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| | Mean | Std dev. | α (α if item deleted) | Skewness | Kurtosis |
|--------------------------|-------------|-------------|--------------------------------------|--------------|--------------|
| Mastery | 3.74 | 0.80 | 0.75 | -0.75 | 0.64 |
| Mastery item 1 | 3.73 | 0.98 | 0.66 | -0.67 | 0.21 |
| Mastery item 2 | 3.94 | 1.03 | 0.69 | -0.82 | 0.17 |
| Mastery item 3 | 3.5 | 1.13 | 0.72 | -0.46 | -0.52 |
| Mastery item 4 | 3.82 | 1.09 | 0.68 | -0.73 | -0.14 |
| Performance | 2.71 | 0.84 | 0.69 | 0.19 | -0.31 |
| Performance item 1 | 3.18 | 1.14 | 0.64 | -0.20 | -0.69 |
| Performance item 2 | 2.66 | 1.16 | 0.61 | 0.22 | -0.77 |
| Performance item 3 | 2.4 | 1.19 | 0.58 | 0.52 | -0.63 |
| Performance item 4 | 2.61 | 1.16 | 0.66 | 0.22 | -0.83 |
| Need Satisfaction | 3.71 | 0.60 | 0.83 | -0.41 | 0.20 |
| Relatedness item 1 | 3.3 | 1.14 | 0.83 | -0.25 | -0.71 |
| Relatedness item 2 | 3.87 | 0.92 | 0.81 | -0.62 | 0.08 |
| Relatedness item 3 | 4.19 | 0.95 | 0.82 | -1.20 | 1.08 |
| Competence item 1 | 3.95 | 0.86 | 0.82 | -0.71 | 0.46 |
| Competence item 2 | 4.04 | 0.85 | 0.82 | -0.65 | 0.08 |
| Competence item 3 | 3.58 | 0.88 | 0.82 | -0.38 | 0.08 |
| Competence item 4 | 3.49 | 0.98 | 0.82 | -0.31 | -0.17 |
| Autonomy item 1 | 3.71 | 1.06 | 0.83 | -0.56 | -0.29 |
| Autonomy item 2 | 3.3 | 1.15 | 0.83 | -0.28 | -0.72 |
| Autonomy item 3 | 3.63 | 1.01 | 0.82 | -0.5 | -0.21 |
| Autonomy item 4 | 3.75 | 0.97 | 0.82 | -0.57 | -0.02 |

Table 1: Descriptive statistics of the study variables.

| Level | Predictor | All ages | | | | Youth | | | | Adults | | | | |
|--------------|-----------------------------------|----------|-------|----------|------|----------|-------|----------|------|----------|-------|----------|------|----|
| | | estimate | s.e. | 95 % CI | p | estimate | s.e. | 95 % CI | p | estimate | s.e. | 95 % CI | p | |
| All levels | Mastery ¹ | - | 0.0 | -.136; - | <.0 | 0.0 | 0.0 | -.208; - | <.0 | - | 0.0 | -.109; - | <.0 | |
| | | 0.107 | 15 | .078 | 01 | -0.16 | 29 | .103 | 01 | 0.084 | 15 | .060 | 01 | |
| | Performance ² | 0.004 | 0.0 | -.006; - | 0.4 | 0.0 | 0.0 | .021; - | 0.0 | -0.01 | 0.0 | -.018; - | 0.0 | |
| | | | 0.004 | 05 | .015 | 36 | 0.044 | 14 | .067 | 02 | -0.01 | 05 | .002 | 34 |
| All levels | Mastery adjusted ³ | - | 0.0 | -.139; - | <.0 | - | 0.0 | -.234; - | <.0 | - | 0.0 | -.108; - | <.0 | |
| | | 0.109 | 15 | .080 | 01 | 0.179 | 33 | .125 | 01 | 0.083 | 15 | .058 | 01 | |
| | Performance adjusted ³ | - | 0.0 | -.026; - | 0.0 | - | 0.0 | -.067; - | 0.0 | - | 0.0 | -.025; - | 0.0 | |
| | | 0.016 | 05 | .006 | 02 | 0.044 | 14 | .021 | 02 | 0.017 | 05 | .009 | 01 | |
| Recreation | Mastery ¹ | - | 0.0 | -.155; - | <.0 | - | 0.0 | -.242; - | 0.0 | - | 0.0 | -.126; - | 0.0 | |
| | | 0.108 | 24 | .061 | 01 | 0.143 | 5 | .060 | 05 | 0.084 | 25 | .043 | 01 | |
| | Performance ² | 0.011 | 0.0 | -.008; - | 0.2 | 0.0 | 0.0 | .006; - | 0.0 | - | 0.0 | -.017; - | 0.5 | |
| | | | 0.011 | 09 | .030 | 47 | 0.049 | 26 | .092 | 62 | 0.004 | 08 | .008 | 62 |
| Recreation | Mastery adjusted ³ | -0.11 | 0.0 | -.159; - | <.0 | - | 0.0 | -.262; - | 0.0 | - | 0.0 | -.127; - | 0.0 | |
| | | | -0.11 | 25 | .062 | 01 | 0.165 | 59 | .067 | 05 | 0.085 | 26 | .043 | 01 |
| | Performance adjusted ³ | - | 0.0 | -.027; - | 0.1 | - | 0.0 | -.085; - | 0.1 | - | 0.0 | -.024; - | 0.0 | |
| | | 0.011 | 08 | .005 | 85 | 0.042 | 26 | .000 | 04 | 0.012 | 07 | .000 | 99 | |
| Intermediate | Mastery ¹ | - | 0.0 | -.162; - | <.0 | - | 0.0 | -.277; - | <.0 | - | 0.0 | -.142; - | 0.0 | |
| | | 0.111 | 26 | .060 | 01 | 0.185 | 47 | .107 | 01 | 0.096 | 28 | .049 | 01 | |
| | Performance ² | 0.039 | 0.0 | .012; - | 0.0 | 0.0 | 0.0 | .018; - | 0.0 | 0.0 | 0.0 | .002; - | 0.0 | |
| | | | 0.039 | 14 | .066 | 04 | 0.064 | 28 | .110 | 22 | 0.023 | 13 | .044 | 71 |
| Intermediate | Mastery adjusted ³ | - | 0.0 | -.161; - | <.0 | - | 0.0 | -.308; - | <.0 | - | 0.0 | -.143; - | 0.0 | |
| | | 0.111 | 26 | .060 | 01 | 0.215 | 57 | .122 | 01 | 0.096 | 28 | .050 | 01 | |
| | Performance adjusted ³ | 0.005 | 0.0 | -.015; - | 0.6 | - | 0.0 | -.107; - | 0.0 | 0.0 | 0.0 | -.011; - | 0.6 | |
| | | | 0.005 | 1 | .024 | 36 | 0.058 | 3 | .009 | 52 | 0.005 | 1 | .020 | 39 |
| Elite | Mastery ¹ | - | 0.0 | -.164; - | 0.0 | - | 0.0 | -.281; - | 0.0 | - | 0.0 | -.079; - | 0.2 | |
| | | 0.095 | 35 | .027 | 07 | 0.165 | 7 | .049 | 19 | 0.033 | 28 | .013 | 43 | |
| | Performance ² | 0.014 | 0.0 | -.011; - | 0.2 | 0.0 | 0.0 | .010; - | 0.0 | - | 0.0 | -.026; - | 0.3 | |
| | | | 0.014 | 13 | .039 | 6 | 0.064 | 33 | .119 | 51 | 0.009 | 1 | .008 | 77 |
| Elite | Mastery adjusted ³ | - | 0.0 | -.187; - | 0.0 | - | 0.0 | -.298; - | 0.0 | - | 0.0 | -.092; - | 0.2 | |
| | | 0.108 | 41 | .028 | 08 | 0.176 | 74 | .054 | 18 | 0.036 | 34 | .019 | 85 | |
| | Performance adjusted ³ | - | 0.0 | -.067; - | 0.0 | - | 0.0 | -.054; - | 0.3 | 0.0 | 0.0 | -.052; - | 0.2 | |
| | | 0.033 | 17 | .000 | 53 | 0.019 | 21 | .017 | 85 | -0.02 | 19 | .012 | 98 | |

Table 2: Mediating effects of the performance and mastery dimension through the satisfaction of the psychological needs for all and separated on age and sporting level. ¹. SEM model with only mastery involving climate in the model as predictor of BPN. ². SEM model with only performance involving climate in the model as predictor of BPN. ³. SEM model with both mastery involving climate and performance involving climate in the model as predictor of BPN.



A: All (estimate, p-value)

R: Recreational level (estimate, p-value)

I: Intermediate level (estimate, p-value)

E: Elite level (estimate, p-value)

Figure 1. Influence of the two motivational climate dimensions on basic needs satisfaction and dropout modelled separately.

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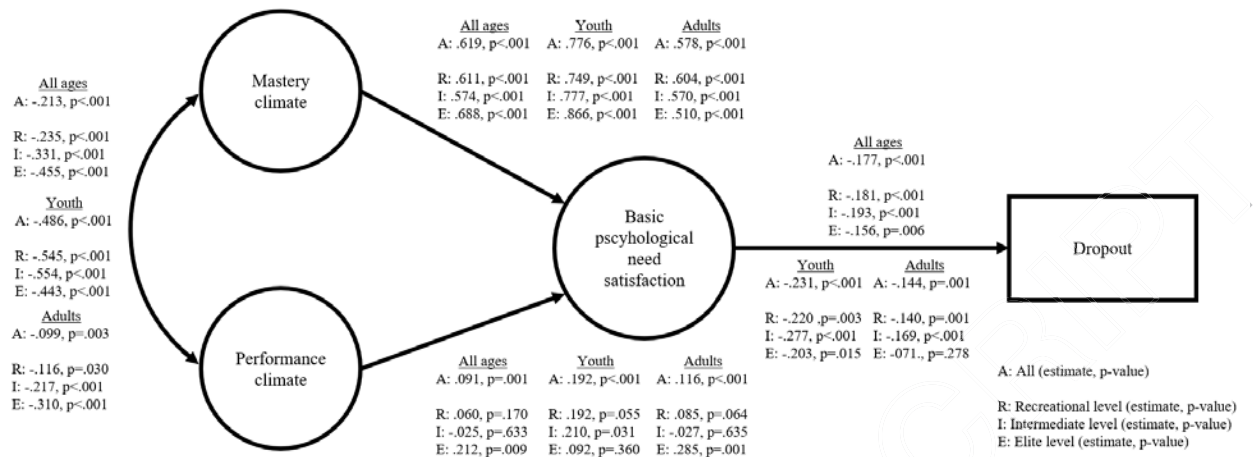


Figure 2. Influence of the two motivational climate dimensions on basic needs satisfaction and dropout adjusting for association from the other climate dimension

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