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The Perception of Psychology and the Frequency of Psychological Strategies used by Strength and Conditioning Practitioners


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ABSTRACT

The study aimed to firstly examine the frequency of the psychological skills and strategies of Strength and Conditioning practitioners and secondly distinguish between demographic differences in relation to psychological skills and strategy use. The Strength and Conditioning Sport Psychology Questionnaire was developed to measure the frequency of use of 11 subscales. These consisted of goal setting, imagery, self-talk, mental toughness, attention control, relaxation, stress management, adherence, activation, self-confidence and ego management. Each subscale demonstrated acceptable internal validity (mean inter-item correlations ranged 0.227 - 0.427). The instrument allowed up to 5 open ended responses concerning skills considered most important to strength and conditioning practice and up to 5 psychological attributes considered detrimental within strength and conditioning. 102 participants met the inclusion criteria (90 men and 12 women. Age 34.7 ± 9.7 yrs. Experience 7.4 ± 5.2 yrs. Part time 36.5%, Full time 63.5%. The respondents were registered with the following organizations: UKSCA: 41, NSCA: 48 and ASCA: 48). Goal setting was found to be the most frequently used skill with mental imagery the least used with significant differences identified in the frequency of skill use. The strategies deemed to be most important were motivation and confidence with the most debilitating factors identified as a lack of motivation and a lack of confidence. When comparing demographics, overall skill use varied between practitioners with different experience with more experienced practitioners having greater skill use, both overall and particular individual skills. Participants accredited by the ASCA had a greater psychological skill use than those accredited by other bodies.

KEY WORDS: Mental training, Goal-setting, Confidence, Motivation, Imagery, Professional development
INTRODUCTION

Strength and Conditioning has developed from an amalgamation of various long-standing disciplines with the Strength and Conditioning practitioner being required to draw on knowledge from ranging disciplines such as Psychology, Biomechanics, Nutrition, and Exercise Physiology. To date the National Strength and Conditioning Association (NSCA) has conducted two studies into the job analysis of Strength and Conditioning practitioners (7, 64) which has been used to determine both the NSCA professional guidelines and the examination criteria for the Certified Strength and Conditioning Specialist (CSCS) examination. As published by the NSCA, the Strength and Conditioning Professional Guidelines state that the ability to “use sport psychology techniques to enhance the training and/or performance of the athlete” is a scientific foundation required by certified Strength and Conditioning Specialists (64). In addition, as a sport training practitioner in regular contact with the athlete the Strength and Conditioning Specialist is in an ideal position to contribute to the psychological aspects of training (5, 33, 53). Furthermore, the coach, rather than psychology titled professionals, has been previously identified as the favored provider of psychological support (53). As such it would be beneficial for Strength and Conditioning practitioners to have knowledge of select psychological techniques and applications within applied practice.

The multifaceted role of a Strength and Conditioner practitioner has been examined in various contexts (21, 22, 24-27, 56, 57, 68, 77), ranging from the practices within various North American sports (22, 24-27, 77), the sources of scientific data and training upon which the Strength and Conditioner’s practice is based (24), to job analysis’s and demographics of coaches working at differing levels of competition (21, 56, 57, 68). Despite the exploration of the responsibilities and practices of Strength and
Conditioning practitioners, the research has focused predominantly on physical training strategies with a dearth of research examining the use of psychology within applied Strength and Conditioning practice. This is emphasized by the widely used *Strength and Conditioning Practices of Professional Strength and Conditioning Coaches* survey instrument (22, 25-27, 56, 74) which focuses on various physical training practices with only the miscellaneous section of “unique aspects” offering scope to examine psychological skill use, consequently such studies have failed to yield data indicating the use of psychological strategies within strength and conditioning practice.

Academic interest in psycho-physiological research has led to a wealth of research exploring how psychological interventions affect variables pertinent to Strength and Conditioning with psychological interventions such as mental imagery (50, 62), attentional focusing (34, 54, 82) video modeling (15, 71, 72), increased self confidence (32, 59, 83), goal setting (8, 38, 80), and arousal increasing strategies (58, 79, 81) examined. Holloway (45, 46) suggested that it would be beneficial for Strength and Conditioning Specialists to apply key psychological self-regulatory and self-expectancy theories and concepts such as imagery, goal setting, motivation, and self-talk to their clients individualized programs, however there is limited research suggesting the use of such skills. Literature has examined the behavior of Strength and Conditioning professionals without objectively exploring the extent to which key psychological strategies (45, 46) are implemented or perceptions towards the importance of such strategies. Such studies have used a combination of self-report inventories (12, 52) and observation (37, 55) with focus on coaching styles and behaviors. Through observational techniques, Massey et al. (55) led the way in determining the frequency of psychological skills used by Strength and Conditioning coaches. The study highlighted the value of motivational techniques within Strength
and Conditioning with behaviors such as ‘hustle’ and ‘praise’ being observed however served as a concern that particular psychological strategies such as positive modeling were neglected in the observed sample.

The examination of the how psychological interventions are utilized by the Strength and Conditioning practitioner and the perceived importance of psychological components is a vital step in facilitating the development of Strength and Conditioning as an expanding discipline. This would therefore offer guidance in regard to scope for practitioner development. The present study hypothesized that due to the documented benefits brought through the utilization of particular strategies, Strength and Conditioning practitioners will indeed use psychological strategies as part of their applied practice. It would be expected that strategies such as those to increase adherence to exercise and motivation will be valued as important and expected to be utilized frequently reflecting the existing work of Massey et al. (55). Conversely it is to be expected that due to a perceived lack of awareness and time restraints particular strategies will be perceived as unimportant and underutilized. However, owing to lacking previous studies, it is unclear as to which skills will be neglected and the mechanisms for which the selection of psychological skills is based. This study will consider the perceptions of accredited practitioners from leading Strength and Conditioning professional bodies with an aim to quantify the frequency to which practitioners utilize psychological skills, the particular strategies perceived to be most important to Strength and Conditioning and to identify possible factors such as experience, and practitioner accreditation programs that account for variations in the use of psychological strategies. It is through analyzing such previously neglected variables that professional development can be targeted toward promoting the use of such key psychological strategies.
METHOD

Experimental Approach to the Problem

To address the research question the present study had three objectives: (1) To quantify the frequency of psychological skills and strategies used by accredited strength and conditioning practitioners, (2) identify the most important psychological strategies and the most debilitating psychological characteristics as perceived by practitioners, and (3) to identify if any difference exists in terms of frequency of use between varying participant demographics.

The study required the construction and validation of a suitable survey instrument; the Strength and Conditioning Sport Psychology Questionnaire (SCSPQ). A sample of accredited Strength and Conditioning practitioners were requested to complete the instrument regarding the frequency of selected psychological strategies and open ended questions allowing space to identify most important and the most debilitating strategies and characteristics for their athletes. Through quantifying the frequency of psychological skill usage measured using the SCSPQ comparisons could be made between the perceived frequency of psychological skill usage depending on both participant demographics and the psychological strategy in question. Non-parametric statistical analysis identified significant differences between the frequencies of psychological skill use. The alpha level from which to identify significant differences between subscale scores was set at < 0.05. Open ended questions invited participants to list the five most beneficial qualities and the five most detrimental qualities with the strength and conditioning environment. Subsequent qualitative analysis adopted the thematic analysis approach (28).
Subjects

Prior to commencing the study the University of Salford Ethical Review Board provided approval for the experimental procedures. Prior to participation all subject received an invitation containing participant information including clear explanation of the potential benefits and risks associated with the research, how the data will be handled, the dissemination of findings, and voluntary nature of the study. An email contact was provided for the lead investigator should any potential applicants request additional information. Subsequent to receiving the participant information participant informed consent was received when participants clicked they wished to take part in the study (3). Participants were recruited through practitioner databases in which the participants were registered as an accredited member as either Australian Strength and Conditioning Association (ASCA) level one or above or United Kingdom Strength and Conditioning Association (UKSCA) Accredited Strength and conditioning Coach (ASSC). Mail shots were distributed via the NSCA through distribution channels that requested response from only accredited Strength and Conditioning practitioners accredited by either the UKSCA (ASSC), the NSCA (Certified Strength and Conditioning Specialist: CSCS) or the ASCA (ASCA Level 1, or higher). The survey instrument directions reinforced that only Strength and Conditioning practitioners were eligible to take part. 104 participants responded. 2 participants did not meet the eligibility criteria of being accredited as a strength and conditioning practitioner by a recognized strength and conditioning association (UKSCA, NSCA, ASCA) 102 participants met the eligibility criteria comprising 90 men and 12 women with a mean age of 34.7 ± 9.7 yrs. Participants had a mean experience of 7.4 ± 5.2 years working as a Strength and Conditioning practitioner. 36.5% of respondents were part time whilst
63.5% working as full time practitioners. Participants were registered with the following organizations: UKSCA Association: n=41, NSCA: n=48, and ASCA: n=48. A number of participants were affiliated with more than one organization. Participants had ranging educational backgrounds (Bachelors, Masters, and Doctoral qualifications in addition to vocational qualifications in related disciplines) however there appears to be no relationship between accredited practitioners affiliation and educational background.

Instrumentation

The SCSPQ initially comprised 44 items measuring the frequency of goal setting, imagery, self-talk, mental toughness, attention control, relaxation, stress management, adherence, activation, self-confidence and ego management. Responses were on a 5 point likert scale from not at all to all the time. The subscales were composed after a review of literature indicating the salient psychological strategies to Strength and Conditioning. Questionnaire content and wording was validated through expert critique of both a Chartered Sport Psychologist (BPS C. Psychol.) and Strength and Conditioning Specialist (CSCS*D, ASCC). Subsequent pilot testing utilized a sample of students on the Strength and Conditioning MSc Degree at a UK university. Subsequent minor changes were made to the wording of questions for example “increasing arousal” was changed to “psyching-up”. Additional open ended question required the respondents to identify up to 5 skills they felt most important to Strength and Conditioning practice and up to 5 psychological attributes that are detrimental within Strength and Conditioning. Participants were asked to provide select demographic data including age, years experience, accrediting body, and the sports they
were predominantly involved in (individual, team or both equally) prior to completing the survey.

Using SPSS 16 (SPSS Inc., Chicago IL), internal consistency of each subscale was measured using Cronbach’s Alpha. The reliability criterion was set at >0.6 due to low number of items within each subscale (51). Subsequent item reduction was conducted to increase internal reliability (19). 13 items were removed resulting in a 31 item scale resulting in acceptable internal consistencies (α>0.6) for Goal Setting (0.677), Ego Management (0.679), Imagery (0.684), Relaxation, (0.658), Stress Management (0.608), and Activation (0.675) subscales. Authors have documented the difficulty in achieving acceptable Cronbach’s alpha levels with small number of items (42, 51), therefore Briggs and Cheek (11) recommend examining inter-item correlations with mean inter-item correlations ideally between 0.2-0.4. All subscales were deemed to have adequate internal consistency, correlations ranging from 0.227 (attentional control) to 0.427 (imagery and ego management).

**Procedure**

Prior to approaching participants, ethical approval for the research procedure was granted by the University of Salford Research Ethics Panel. The survey was administered in electronic format using the Bristol Online Survey instrument (Bristol University: UK). Convenience sampling used contacts collected from publicly available databases (UKSCA n= 101 and ASCA n=425) and through distribution on behalf by organization administration staff (BASES n=111). The instrument was emailed with a covering letter introducing the research stating the demands, potential benefits, potential risks, and the voluntary nature of the study as well as dissemination
procedures for the research findings. Participants received two follow-up reminders via email and were thanked upon completion. NSCA distributed the survey in the NSCA December e-bulletin to members on the mailing list (NSCA n≈26,000). The survey was active for a seven month period (August-February).

Statistical analysis

Descriptive statistics including means, standard deviations and mean ranks for each of the subscales and subsequent A posteriori analysis with appropriate non-parametric tests was conducted using SPSS 16 (SPSS Inc., Chicago IL, USA). Non-parametric analysis was used as the data failed to satisfy criteria for parametric analysis owing to the wording of the likert scale being subjective and not applicable to interval level measurement, the convenience sampling methods used, and the data not having normal distribution (44). The Holm-Bonferroni method was utilized to counter family-wise type I error (47) as it more powerful yet less conservative than the traditional Bonferroni procedure (1, 30, 75). The debate over the need for multiple comparison corrections is documented with advocates for and against using corrected levels of significance (30). Multiple comparison corrections serve to prevent the family-wise type I error however dispute lies with the apparent extent of the family (14, 30) with the consequences of excessive corrections threatening type II error (70). For the purpose of the present study a family is termed as a number of comparisons directly relating to a single null hypothesis (30) statistical power was calculated using G*Power software (version 3.1.3: (29)).

The Friedman test was used to identify significant differences in the frequency of psychological skill use with the critical value for significance set at < 0.05.
Subsequent analysis of variance between the frequencies of skill use was conducted
using the Wilcoxon Signed Ranks with a Holm-Bonferroni correction to control for
family-wise type I error (47). The pairs were nominated for analysis on the basis of the
observed difference in the mean rank scores with the intention to identify the
differences most relevant to the present study on the presumption that larger z–values,
effect sizes, and smaller alpha values will lie within other comparisons. The stringency
of the criteria to be nominated for analysis was on the basis that excessive comparisons
will be detrimental to the adjusted alpha value and risk type II errors.

Subjects were then categorized based upon demographic criteria. This included
experience, working with predominantly teams or individual athletes, and accrediting
body. The Kruskal-Wallis test identified the presence of significant differences between
the groups when split by experience, accrediting body, and working with team or
individual athletes. Mann-Whitney tests highlighted location of the differences using
the Holm-Bonferroni correction.

Open ended questions asked respondents to list up to five psychological skills
critical to their athlete’s successful performance and up to five psychological factors
which are detrimental to their athlete’s performance. The responses were subjected to
thematic analysis using NVivo 8 (QSR International Pty Ltd. Version 8, 2008.:(69)).

RESULTS

Frequency of use of psychological skills measure using the SCSPQ

The results identify the rank order of the psychological strategies used by
Strength and Conditioning practitioners. To the authors knowledge this is the first paper
to rank the order of the frequency of psychological strategies use as perceived by practitioners.

Descriptive statistics were calculated for the 11 subscales and the total subscale scores (table 1). The Friedman test identified that there were significant differences between psychological skills in terms of frequency of use in the frequency of psychological skill use ($x^2=293.053$, df=2, $p<0.000$). This therefore supports the hypothesis that differences exist between the frequencies of use of particular strategies.

Subsequent pair-wise analysis was performed with pairs selected subjected to the Holm-Bonferroni correction. Six pairs were identified on the basis to identify the smallest significant differences whilst preserving an appropriate significance value.

Thus, after scrutinizing the data for apparent mean and mean ranked subscales differences, 6 pairs were identified for a posteriori analysis using 1-tailed Wilcoxon Signed Ranks test. Significant differences existed between goal setting and adherence.
(z = -2.678, p = 0.004, d = 0.38, Power =0.98), self-talk and activation (z = -1.728, p = 0.042, d = 0.17, power =0.53), activation and attention control (z = -2.892, p = 0.002, d = 0.29, power =0.88), stress management and relaxation (z = -2.750, p = 0.006, d = 0.23, power =0.71), self-confidence and ego management (z = -2.005, p = 0.023, d = 0.27, power =0.83), and imagery and ego management (z = -2.270, p = 0.012, d = 0.24, power =0.75). It must be acknowledged that additional larger differences are assumed to exist between subscales.

Comparison of strategy use between experience levels

When comparing differing demographics, there were significant differences in the frequency of skill use depending on the respondents’ experience thus fulfilling a subsequent aim of the study by identifying differences between demographics relating to skill use. Table 2 shows the comparison between the frequencies of psychological skills of practitioners with differing levels of experience.

When grouped by experience, 0-4 years (n=33, Age:29.21yrs ± 8.1), 5-9 years (n=34, age:32.8years ± 6.1), and 10+ years, (n=35, Age:42.5 ± 9.4) the Kruskal-Wallis between groups test yielded significant differences in the frequency of use of imagery (x²=15.2, df=2, p<0.001), attentional control (x²=6.669, df=2, p=0.036), stress management (x²=9.327, df=2, p=0.009), self-confidence (x²=8.746, df=2, p=0.013), and total skill use (x²=12.927, df=2, p=0.002).
Subsequent *a posteriori* analysis using Mann-Whitney with a Holm-Bonferroni corrected significance values identified that the imagery ($z = -3.700, p < 0.001, d = 1.21$, power =0.999), attentional control ($z = -2.480, p = 0.007, d = 0.61$, power =0.78 ), stress management ($z = -2.951, p = 0.002, d = 0.83$, power = 0.96), self confidence ($z = -2.953, p = 0.002, d = 0.76$, power =0.92), and total skill used ($z = -3.499, p < 0.001, d = 0.96$, power = 0.99) was significantly greater in the 10+ years group compared to the 0-4 years experience group.

Self confidence ($z = -2.088, p = 0.019, d = 0.52$, power = 0.66) was used significantly more by the 5-9 years experience group than the 0-4 years experience group.
Imagery \((z = -2.828, p=0.003, d= 0.67, \text{power} = 0.67)\), stress management \((z = -2.050, p=0.020, d = 0.48, \text{power} = 0.60)\), and total skill use \((z = -2.216, p=0.019, d = 0.56, \text{power} = 0.71)\) was used significantly more in the 10+ years group compared to the 5-9 years group.

**Comparison between respondents accrediting bodies**

In respect to identifying potential difference between accrediting bodies, a subsequent objective of the study was achieved by identifying potential factors relating to the use of psychology within strength and conditioning practice.

Respondents were grouped into categories according to the respective accrediting bodies. These were ASCA \((n=36, \text{age: } 36.6 \text{ yrs }\pm 10.2, \text{experience: } 9.22 \text{ yrs }\pm 7.4)\), NSCA \((n=24, \text{age: } 33.75 \text{ yrs }\pm 9.8, \text{experience: } 6.58 \text{ yrs }\pm 5.5)\), both NSCA and ASCA \((n=12, \text{age: } 35.8 \text{ yrs }\pm 8.3, \text{experience: } 11.3 \text{ yrs }\pm 6.3)\), and both NSCA and UKSCA \((n=20, \text{age: } 33.8 \text{ yrs }\pm 11.5, \text{experience: } 8.0 \text{ yrs }\pm 7.0)\). Using the Kruskal-Wallis test, the results yielded significant differences between the frequency of total psychological skill use of respondents from different accrediting bodies \((x^2= 10.220, \text{df } = 3, \ p=0.017)\). The Kruskal-Wallis test show that significant differences existed between the frequencies of select psychological skill usage of respondents from different accrediting bodies. Differences existed in the frequency of attentional control strategies \((x^2= 10.865, \text{df } = 3, \ p=0.12)\), relaxation strategies \((x^2= 10.673, \text{df } = 3, \ p=0.014)\), stress management strategies \((x^2= 8.129, \text{df } = 3, \ p=0.43)\), and ego management \((x^2= 13.351, \text{df } = 3, \ p=0.004)\).

I tailed *a posteriori* Mann-Whitney test with the modified Holm-Bonferroni correction (47) identified differences between the ASCA and the both NSCA and UKSCA groups with ASCA having a greater total psychological skill \((z= -2.892,\)
p=0.002, d = 0.94, power = 0.95), attentional control (z= -2.904, p=0.002, d = 0.88, power =0.95), relaxation strategies (z= -2.295, p<0.001, d = 1.00, power = 0.97), stress management strategies (z= -2.571, p=0.005, d = 0.74, power = 0.82) and ego management strategies (z= -3.153, p=0.001, d = 1.01, power = 0.97) than the both NSCA and UKSCA group.

Furthermore differences existed, although not achieving significance when subjected to the modified Holm-Bonferroni correction (47), between the ASCA and the NSCA groups. The ASCA having a greater total psychological skill use (z= -2.348, p=0.019, d = 0.61, power = 0.71), with use of greater attentional control strategies (z= -2.323, p=0.020, d = 0.59, power =0.70) than the NSCA group.

Factors important to success and factors debilitate to performance

Table 3 shows the most commonly cited psychological aspects critical to an athletes’ success and judged by the sampled practitioners. Respondents highlighted that the most important psychological attributes relevant to Strength and Conditioning were motivation, confidence and commitment with 63.37%, 51.49% and 48.51% respectfully of respondents identifying such characteristics as important for success within Strength and Conditioning. Table 4 presents factors considered detrimental to Strength and Conditioning training by Strength and Conditioning practitioners. This showed that a lack of motivation, a lack of confidence, stress and anxiety were the
most often reported causes of a poor performance with 54.46%, 45.54% and 32.67% respectfully of the respondents stating such issues.

**Table 3** Factors listed by practitioners as important to the athlete’s successful performance and the percentage of respondents (n=102) stating such factors as important. Measured using open ended questions within the SCSPQ.

<table>
<thead>
<tr>
<th>Factors critical to success</th>
<th>% consensus of respondents (n=102)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>63.37%</td>
</tr>
<tr>
<td>Confidence</td>
<td>51.49%</td>
</tr>
<tr>
<td>Commitment</td>
<td>48.51%</td>
</tr>
<tr>
<td>Focus</td>
<td>38.61%</td>
</tr>
<tr>
<td>Mental toughness</td>
<td>32.67%</td>
</tr>
<tr>
<td>Positive attitude</td>
<td>23.76%</td>
</tr>
<tr>
<td>Goal setting</td>
<td>23.76%</td>
</tr>
<tr>
<td>Correct level of concentration</td>
<td>22.77%</td>
</tr>
<tr>
<td>Routines and organization</td>
<td>20.79%</td>
</tr>
<tr>
<td>Mental rehearsal</td>
<td>18.81%</td>
</tr>
<tr>
<td>Comparisons with others</td>
<td>16.83%</td>
</tr>
<tr>
<td>Relaxation</td>
<td>16.83%</td>
</tr>
<tr>
<td>Review of performance inc feedback</td>
<td>13.86%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

**Table 4** Factors listed by practitioners as detrimental to the athlete’s performance and the percentage of respondents (n=102) stating such factors as important. Measured using open ended questions within the SCSPQ.

<table>
<thead>
<tr>
<th>Factors detrimental to performance</th>
<th>% consensus of respondents (n=102)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of motivation</td>
<td>54.46%</td>
</tr>
<tr>
<td>Lack of Confidence</td>
<td>45.54%</td>
</tr>
<tr>
<td>Stress and anxiety</td>
<td>32.67%</td>
</tr>
<tr>
<td>Ego</td>
<td>31.68%</td>
</tr>
<tr>
<td>Not focussed towards training objectives</td>
<td>26.73%</td>
</tr>
<tr>
<td>lack of commitment</td>
<td>19.80%</td>
</tr>
<tr>
<td>Burnout and depression</td>
<td>15.84%</td>
</tr>
<tr>
<td>Negative attitude towards training and competition</td>
<td>14.85%</td>
</tr>
<tr>
<td>Inappropriate goal setting</td>
<td>14.85%</td>
</tr>
<tr>
<td>Poor planning and organisation</td>
<td>13.86%</td>
</tr>
</tbody>
</table>
As was hypothesized it was apparent that Strength and Conditioning coaches utilize and value psychological skills, however as expected an imbalance between the use of particular strategies was observed. As predicted, adherence increasing strategies and goal setting were widely used whereas complex strategies, namely mental imagery, were used the least. It was highlighted that there is a difference in the frequency of using psychological strategies within the prescribed practice of Strength and Conditioning practitioners. Furthermore when comparing between groups it was apparent that there are differences in psychological skill use depending on the level of experience of the practitioner and also the body through which the practitioner gained accredited status.

The most utilized strategy was the use of goal setting. This was in line with the existing research showing short term goals are amongst the most commonly utilized psychological skills in physiotherapy (4, 5, 43) and in athletic training (84). The perceived increased use of goals setting is most likely owing to the nature of Strength and Conditioning practice using established targets and physiological benchmarks from which to determine the effectiveness of a training intervention. It is also probable that the increased use of goal setting is dependent upon the Strength and Conditioning specialists’ perception of the previous success using the strategy. Indeed, Sullivan and Hodge (76) have previously identified goal setting as a strategy coaches had most success utilizing. Furthermore with the reported lack of time to use psychological strategies (17) it is likely coaches will focus their use of psychological strategies on those perceived as most beneficial to the neglect of other skill sets. The high frequency of goal setting strategies is encouraging with numerous academics advocating such strategies with the use of goal setting being a major determining factor between successful and unsuccessful athletes (23, 66).
Conversely, the least used strategy was imagery, mirroring existing knowledge that imagery was considered unimportant and difficult to prescribe by athletic trainers (40, 84) and underutilized within physiotherapy (4, 5). The lack of prescribed imagery interventions could be for numerous reasons. Primarily it is possible that there is uncertainty of the applications towards Strength and Conditioning either the benefits of imagery interventions or the methods of instructing imagery. The lacking promotion of imagery is supported by the widely documented reason for neglecting psychological being a lack of understanding (5, 20, 40, 43, 63, 85) with sports coaches and athletes previously reporting that amongst other skills, imagery and visualization is an area in which they would like more information (39). An important consideration is time demands required for the athlete to become adept at using prescribed imagery strategies. Consequently athletes may perceive imagery as an ineffective tool causing practitioners to have a negative attitude towards the use of imagery as was observed in a sample undergoing physiotherapy rehabilitation (35). The lacking use of imagery is problematic, notably because of the benefits elicited through imagery training towards increased strength (50, 89), EMG activity (87), technique development (65, 73), stress regulation (86), and program adherence (61).

The lacking use of imagery, and indeed additional psychological strategies, may be accounted for due to the nature of the discipline; previous studies show that coaches working with athletes in both practice and competition, were reported to encourage the use of imagery in a competition setting compared to practice (48). Thus, with the Strength and Conditioning practitioner being concerned with training it is possible that use of particular psychological strategies are undervalued and perceived less relevant to training compared to competition, reflected in various studies when mental skills have been shown to be used less in training compared to competition (36, 78). The
perceived lack of importance of psychological strategies in practice has been identified
previously and serves as a concern that skills are being used less in a practice setting.
Durand-Bush and Salmela (23) have identified that the use of psychological strategies
by expert performers are shaped through practice, during daily activities, and in
conjunction with training activities. This would suggest that the Strength and
Conditioning practitioner could play a critical role in the development of psychological
skills with transfer of such skills into competition to compliment physical development.
Therefore, education into the importance of psychological skills in training and indeed
transfer to completion should receive increased emphasis within practitioner
development.

In identifying critical psychological strategies, motivation and confidence were
amongst the most important while correspondingly a lack of confidence and a lack of
motivation were the most debilitating factors. Although the importance of motivation was
reflected in the frequent use of certain strategies such as goal setting and increasing
adherence there is an imbalance between the perceived importance and the frequency
of use of self-confidence shaping strategies. Possible reasons for such a disparity may
be either that practitioners feel that confidence is an innate characteristic unable to be
modified or that there is lacking knowledge in the techniques to increase self-
confidence. Likewise it is possible that the respondents are using confidence promoting
strategies that are not included within the survey instrument. The survey instrument
focused upon established sources of self-efficacy such as vicarious experiences and past
accomplishments, the latter being regarded as the most influential source of self-
efficacy (9, 10, 88) however the use of verbal persuasion received limited coverage
within the self-confidence subscale. The effects of verbal encouragement have
previously been shown to benefit lifting performance significantly (60) and the use of
‘hustle’ and ‘praise’ have been observed previously within Strength and Conditioning (55). Despite not observed in the present study, it is therefore probable that practitioners utilize verbal persuasion as a source of increasing confidence however are not using additional strategies to increase athlete self confidence.

As hypothesized, it was apparent that the use of psychological strategies is related to experience. Various reasons could account for this. Firstly, it is possible that as previously identified practitioners develop their skills ‘on the job’ as observed in physiotherapy and sports coaching (49, 76) as such gain more experience and confidence in implementing psychological strategies and consequently prescribe more than their less experienced counterparts as reflected in the practices of athletic trainers (40). As a result, despite having the prerequisite knowledge of psychological skills and its importance practitioners may not have sufficient confidence, fostered through experience, to implement such strategies. Secondly, Strength and Conditioning practitioners are required to maintain their respective accreditation. For example the UKSCA, the ASCA, and the NSCA have the Continual Professional Development (CPD) model, the updating procedure, and the Continuing Education Program respectively. An accredited practitioner must demonstrate advancement to maintain their accreditation status, usually via documented hours of practice or though attending relevant training (64). As a result practitioners are required to attend training and reflect upon successful and unsuccessful aspects of their practice, thus potentially shaping their applied practice. It should however be noted that the training sessions attended are at the discretion of the practitioner, there is no requirement to attend CPD sessions with an emphasis on psychology per se. Furthermore it has been documented that despite an interest in psychology and an awareness of the benefits of implementing such strategies, few numbers of physiotherapists, similarly having to maintain a CPD record, have
attended training concerning the use of psychological strategies (49). The effectiveness of CPD training and procedures concerting the use of psychological strategies and indeed the sources influencing psychological skills is an area worthy of further investigation.

When drawing comparisons between practitioners accredited from various accrediting bodies, the NSCA, UKSCA, and ASCA it is apparent that respondents accredited by the ASCA had a greater global psychological skill use, using such skills as imagery, self-talk, attentional control, relaxation, and stress management strategies more than their counterparts accredited by other organizations. Unfortunately, many of the respondents had duel accreditation; consequently the present study cannot differentiate between those accredited by the NSCA and UKSCA. Further research is required to ascertain if a difference exists between the psychological skills and strategy use of those practitioners having been accredited with the UKSCA and those accredited with the NSCA. There are proposed reasons for the increased use of psychology by practitioners. Firstly it is possible that culture has a pivotal role in the use of psychology with the majority of UKSCA accreditations practicing in the UK and similarly most ASCA practitioners surveyed being located in Australia (44 of the 48 ASCA accredited practitioners). For example Sullivan and Hodge (76) documented that coaches and athletes from New Zealand considered psychology as very important devoting on average 12% of their contact time to teaching psychological strategies to their athletes with some coaches reported to spending up to 30 hours per week teaching psychological strategies, despite 73% of coaches perceiving themselves to have insufficient knowledge. Conversely, it is apparent that within certain areas of sport in the UK such as Association Football in which with coaches portrayed a negative perception of Psychology (67). The disparity between cultures has previously been identified with
athletes from New Zealand being more open with less stigmatization towards the use of psychology than those observed in the USA and in the UK (2). Indeed, athletes from New Zealand demonstrated a greater positive perception towards using psychology than those athletes from the USA and UK, furthermore Anderson et al. (2) identified that ‘subjective norms’ were predictive of athletes likelihood to be receptive of psychological skill use suggesting cultural influences shaping the use of psychology. The reduced receptivity toward psychology use may have two implications. Firstly it is likely that the Strength and Conditioning practitioner may share a skeptical perception towards psychology fostered within cultural influences and thus be reluctant to utilize psychological strategies. Secondly it is possible that the athletes reduced receptivity will reduce the effectiveness of any psychological strategies consequently resulting in a reduced perception towards the effectiveness of psychology and subsequent reduced use of particular strategies.

A second potential explanation would be the perceived lack of understanding towards implementing psychological strategies. This is broadly cited as a major cause inhibiting the use of psychology (5, 20, 40, 43, 63, 85). Thus, it is pertinent to examine differences in educational procedures between various accrediting bodies. The ASCA Strength and Conditioning coaching course is split into three levels with stage one having a component regarding “modifying training programs to suit the psychological development of the athlete” (6) with competence measured via direct observation. The NSCA Certified Strength and Conditioning specialist assessment contains multiple choice questions to assess competence in using “sport psychology techniques to enhance the training and/or performance of the athlete”. Conversely, there is no apparent assessment of psychological competencies in the UKSCA Strength and Conditioner Practitioner assessment. It has been reported that when exposed to the use
of psychological strategies, in turn gaining more understanding, practitioners are more likely to implement such psychological skills (33). This would indicate that Strength and Conditioning practitioners accredited through the ASCA may have increased exposure to psychological strategies though either initial training or through applied practice and CPD consequently may be a more beneficial CPD model to adopt to promote the use of psychological strategies.

It should be noted that the current study had limitations. Importantly, it is noteworthy that completion of the survey was voluntary; therefore it could be assumed that the findings are biased towards practitioners with an interest in sport psychology and possibly having an increased perception of skill use. The study was based on the perceptions of the respondents. Consequently, the subjective nature could have caused discrepancies of the rating scale with respondents potentially having different perceptions of time demands. The self-report survey could present a social desirability bias. Further research should consider using a multidimensional approach with triangulation including observational techniques to verify the responses. Additionally, the survey instrument subscales did not offer scope for assessing specific method of goal setting strategies, the various styles of imagery, or methods of increasing self-confidence. Furthermore it was beyond the scope of the present study to identify the quality of the psychological skills and strategies utilized. Whist it is encouraging that Strength and Conditioning practitioners are implementing psychological strategies future studies must address the effectiveness of implementing such strategies. Furthermore, additional research would be well directed to the reasons why particular strategies are implemented or neglected. This would provide important consideration regarding the training and CPD which Strength and Conditioners undergo and provide direction for future strategies to promote psychology within Strength and Conditioning.
PRACTICAL APPLICATIONS

The Strength and Conditioning practitioner is a valued member of the sport support team and coupled with being in a critical role should be well equipped to develop the psychological skills of the athlete, both to facilitate Strength and Conditioning training, and to offer a valuable environment in which to rehearse assorted psychological strategies in preparation for competition. Areas should be addressed through CPD to offer a greater scope of strategies to the Strength and Conditioning practitioner thus benefitting the athletes and the profession as a whole. Practitioners would be well advised to attend sessions to gain confidence in utilizing psychological strategies and likewise organizations should make such sessions readily available to attend and endeavor to promote the use of psychological strategies. Respective CPD programs should endeavor to promote the use of psychology within the discipline though offering training methods which incorporate the active practice of psychology. Strength and Conditioning professionals should critically reflect on the use of psychological strategies within their practice, identifying positive aspects brought through psychological interventions and areas in which improvements could be made. Through critical reflection, ‘on the job’ learning can be enhanced. Reflection would promote a greater awareness and development of currently used strategies, for example the use of goal setting, and encourage a problem solving mindset needed to select appropriate beneficial psychological strategies within the Strength and Conditioning field. Practitioners should whenever possible be given the opportunity to attend active training sessions in which the practitioner is exposed to practical scenarios and role playing situations as this has many proven benefits not least the providing the
practitioner with confidence to implement strategies and is the approach recommended for athletic trainers (16).

Strength and Conditioning practitioners should collaborate with additional support staff and athletes to foster an atmosphere receptive of psychological interventions liaising with additional support staff including coaches and psychologists where applicable to facilitate the psychological development of athletes. In order to promote the benefits of psychology Strength and Conditioning practitioners should incorporate an education phase regarding the benefits of their prescribed psychological strategies in line with recommendations regarding psychological skills training (13). The education should be not only in respect to training improvements but how psychology can be utilized in competition and the requirement to practice psychological skills in the same way physical skills are acquired. Strength coaches should recognize the potential influence they could have on the athletes they support and how they incorporate psychological strategies used in competition.

Such examples would exist through manipulations of self-efficacy through the use of goal setting. As previously identified, the manipulation of athlete perceived goal difficulty can have a facilitative effect on efficacy (31, 83, 88). Consequently through the use of manipulated goals it is possible that the athlete is able to progress from a training plateau and subsequently allow the practitioner to continue to progressively increase the athletes training loads. Further examples would concern the use of attentional focusing techniques. For example simply instilling an external focus of attention has been shown to yield increased force production (54, 90). Consequently, through instructing an athlete to focus on the bar when lifting or to jump and reach a target is likely to yield increase force production when compared to instructing using internal focusing cues such as drive with your legs. These are simplistic instances of
using psychological strategies to provide training performance gains with direct
implications for physical performance within competition. Furthermore skills such as
mental imagery and self talk have been shown to facilitate power exercises (50, 81)
with both methods identified as adaptive strategies to increase confidence, motivation,
focus and technique (18, 41). Thus whilst particular skills can be utilized in training,
for example to improve motivation or to facilitate technique acquisition, such skills
have direct applications towards competition, with parallels existing concerning the
need to focus attention, increase confidence, or to regulate anxiety during competition.
Consequently, the benefits of being adept at utilizing psychological skills in
competition is a crucial component of success and as such should be afforded time
during practice to refine such skills.

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The results of the present study do not constitute endorsement of any of the accreditation or professional development programs processes discussed in the present study by either the authors or the NSCA.

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**FIGURE LEGENDS**

866  **Table 1** Descriptive mean frequency of skills used by strength and conditioning specialists (n=102) with standard deviation. Split by subscale and global
psychological skill use measured by the SCSPQ. *1Rating Scale not at all = 1 to all
the time = 5. *2Total skill use minimum possible score = 33 – maximum possible
score = 155.

Table 2 Descriptive means ± standard deviation of skill use by strength and conditioning
practitioners with different levels of experience. Split by subscale and global psychological
skill use measured by the SCSPQ. *1Rating Scale not at all = 1 to all the time = 5.
*2Total skill use minimum possible score = 33 – maximum possible score = 155.

Table 3 Factors listed by practitioners as important to the athlete’s successful
performance and the percentage of respondents (n=102) stating such factors as
important. Measured using open ended questions within the SCSPQ.

Table 4 Factors listed by practitioners as detrimental to the athlete’s performance and
the percentage of respondents (n=102) stating such factors as important. Measured
using open ended questions within the SCSPQ.