A Prospective Study of the Relationships Between Motivational Orientations and Perceived Competence with Intrinsic Motivation and Achievement in a Teacher Education Course

MARIOS GOUDAS, STUART BIDDLE & MARTIN UNDERWOOD,
University of Exeter, UK

ABSTRACT  This study utilised a prospective design in examining determinants of intrinsic motivation in a physical education teacher education course. At the outset of a one-term Olympic gymnastics module students in the third year of a 4-year degree course completed questionnaires measuring their perceived autonomy and competence regarding the module. On completion of the module, students replied to questionnaires assessing their intrinsic motivation as well as their intentions to study a gymnastics course in the future. Structural equation modelling analysis showed that both perceived autonomy and competence had effects on intrinsic motivation, although the latter was indirect through performance. Further, intrinsic motivation had a strong effect on intention. This study shows the importance of creating perceptions of autonomy in student teachers when the promotion of intrinsic motivation is desired.

The importance of motivation is recognised by people in all aspects of education and achievement. However, this general recognition hides the complexity and diversity of paradigms and perspectives used to explain human motivation. Weiner (1992) shows how motivation research has shifted from drive-orientated paradigms to those associated with social cognition. This latter approach relies on the assessment of self-perceptions. While much of motivational research has been conducted in classroom settings, relatively few studies have examined college students' motivation. Even fewer motivational research has been conducted on teacher education programmes.

Intrinsic motivation (IM) has been one of the concepts studied in motivational research in education (Schunk & Meece, 1992). Intrinsic motivation refers to be-
haviours performed in the absence of external rewards. Thus, a student who devotes energy to studying for the pleasure derived from this activity is thought to be intrinsically motivated. Cognitive Evaluation Theory (CET) (Deci & Ryan, 1985), has played a central role in the study of IM. According to this theory, IM stems from two basic human needs: the need for competence and the need for autonomy. A plethora of studies has shown that perceived competence is positively associated with IM (see Harter & Connell, 1984) and Deci and Ryan (1980) reviewed studies demonstrating that increases in perceived competence resulted in increased IM. Similar effects were obtained in a physical education setting by Whitehead and Corbin (1991). Perceived competence has also been shown to be a positive predictor of performance (Harter, 1981; Grohnic et al., 1991).

Perceived competence, however, is not the sole determinant of IM. Deci & Ryan (1985) have theorised that the degree of autonomy people feel in their actions is an important antecedent of IM. They assert that activities that are initiated from within the self will be more intrinsically motivating than activities that are initiated by some external force or pressure. Nevertheless, there may be activities that are initiated within the self which are not autonomous. For example, when standards of performance are set by oneself, then there is a form of self-control and the activity is not completely autonomous. Thus, Ryan et al. (1985) have distinguished between external, introjected and identified regulation of behaviour.

External regulation refers to behaviour that is initiated and maybe sustained for external inducement. In this case, behaviour is shaped by external rewards or contingencies. Students who participate in the gymnastics class because it is compulsory and feel that they would be punished if they did not take part, are externally regulated for participating.

In introjected regulation, action is controlled by rules set by oneself. Avoidance of negative self-evaluation is the main aim of this. Students who complete their assignments in order not to feel bad about themselves display introjected regulation. Thus, this type of regulation is a form of control from within the self.

In identified regulation the individual values the activity and possible benefits that are associated with it. For example, students who try hard in football lessons because of the belief that getting in the football team may enhance their social status reflect identified regulation. Deci and Ryan (1985) have also introduced the concept of 'amotivation' to describe non-motivated behaviour.

Deci and colleagues (Deci et al., 1991) have argued that these different forms of motivational styles can be located on a continuum of perceived locus of causality, with amotivation at the one extreme and intrinsic motivation at the other. This continuum represents an 'index of relative autonomy' as perceived by the individual.

Ryan and Connell (1989) examined the correlates of these motivational orientations in elementary schoolchildren. They found that external and introjected regulation were associated with cognitive anxiety in school, while identified regulation and intrinsic motivation were positively correlated with ratings of enjoyment and exerted effort. Vallerand and Bissonnette (1992) examined the predictive capacity of motivational orientations in an academic setting. At the beginning of a term, college students enrolled in a compulsory course were assessed for their motivational orientations towards studying at college. Then, at the end of the term, students' dropout from the course was recorded. The results showed that those students who dropped out had higher levels of amotivation and lower levels of intrinsic motivation and identified regulation. Thus, motivational orientations were shown to be predictive of behavioural
persistence. However, the effect of perceived competence was not examined concurrently with that of motivational orientations. Grolnick et al. (1991) showed that both perceived competence and perceived autonomy had direct effects on academic achievement.

The present study, therefore, was designed as an extension of the study of Vallerand and Bissonnette (1992). More specifically, we sought to examine whether motivational orientations and perceived competence at the beginning of a university physical education course for student teachers would be related to their examination performance on the course and post-course intrinsic motivation. In addition, the study investigated whether intrinsic motivation would be related to students' intention to be involved in a similar course in the future. It was hypothesised that perceived competence and relative autonomy would influence both performance and intrinsic motivation in a positive direction.

Method

Sample

The sample consisted of 40 undergraduate physical education (PE) students in their third year of a 4-year teacher education degree course at a university in the south-west of England. The group comprised 17 women and 23 men, aged 20–25 years.

Course

The course studied was a one-term compulsory module of Olympic gymnastics. The duration of this module was 10 weeks with students required to attend for 2 hours each week in the gymnasium. The module consisted of gymnastic activities related to asymmetric bars, beam, floor, low bar, parallel bars, pommel horse, rings and vault. At the outset of this module, students received a booklet illustrating the activities that they could attempt. Using the booklet, students could teach and assist each other from a core and option programme. Thus, in each session students were doing practical work in small groups while the university teacher had a supervising and teaching role.

Regarding evaluation, students were assessed on their ability to demonstrate gymnastic sequences. Each gymnastics sequence was divided up into sections. Initially, the teacher assessed these individual sections of the sequences. Once the students were familiar with the required standards of performance, they were allowed to assess each other. However, students were not only assessed on the individual sections of the sequence, but they received ‘bonus’ points for being able to demonstrate the whole sequence. The teacher assessed the whole sequence. Thus, evaluation was continuous in that each gymnastic activity, or part of the activity, was awarded points and students gradually accumulated points towards a final mark. These points were clearly shown in the booklet. Students knew at the outset of the course the number of points that were required to achieve a pass or particular grade. Consequently, throughout the module students also knew how well they were doing at any one stage in relation to the final grade.

Procedure

Motivational orientations and perceived competence were assessed at the beginning of
the course, after the students had completed one session. This was to allow the students to have some idea about the content of the course and to assess their competence in a meaningful way. Intrinsic motivation, intention and student grades were recorded at the end of the course. Students were assured about the confidentiality of their answers at all times and the class teacher was not involved in the collection of any data.

**Instrumentation**

**Motivational Orientations.** Items adapted from the Academic Motivation Scale (AMS), (Vallerand et al., 1992) were used for the assessment of motivational orientations. The AMS contains subscales of amotivation, external regulation, introjected regulation, identifications and three subscales of intrinsic motivational orientation, namely intrinsic motivation to know, to accomplish and to experience stimulation. Of these last three, the subscales ‘to know’, and ‘to accomplish’ were deemed relevant to the present study and were examined. A mean score of all the items comprising these two subscales was used as an index of intrinsic motivational orientation.

In the introduction to the questionnaire, subjects were asked why they participated in the gymnastics course and were instructed to rate the items on a seven-point scale anchored by ‘Does not correspond at all’ and ‘Corresponds exactly’. The stem for the items was “I take part in the gymnastics course...”. Ryan and Connell (1989) have shown that an index of self-determination—the Relative Autonomy Index (RAI)—can be obtained by giving each orientation scale a relative weight as follows: External regulation (−2), Introduction (−1), Identification (+1) and Intrinsic motivation (+2). The RAI is then computed by adding the products of the motivational orientation subscales by their relative weight [1].

**Perceived Competence.** Five items were used for the assessment of perceived competence. Example items were “I am one of the best in class in gymnastics”, “My ability in gymnastics is well above average”. Answers were given on seven-point scales anchored by ‘Strongly disagree’ (1) and ‘Strongly agree’ (7).

**Intrinsic Motivation.** At the end of the course students completed the Intrinsic Motivation Inventory (IMI). The IMI was constructed by Ryan (1982) and has four subscales: enjoyment/interest; effort/importance; competence; and pressure/tension. McAuley et al. (1989) demonstrated the construct validity of this instrument in physical activity settings. A total score, with pressure/tension scored in reverse, provides an index of overall intrinsic motivation.

**Intention.** The question “Will you take a gymnastics course in the future if you have a choice?” served for assessing future intention. Answers were given on a seven-point scale anchored by ‘NO!’ and ‘YES!’.

**Performance.** Students were requested to record their grade for the course. Four grades were given corresponding to the usual British degree classification scale of: 3rd, 2nd (lower), 2nd (upper) and 1st. As explained before, the grade was arrived at by summing the points students gained in each particular activity.
TABLE I. Internal and test–retest reliabilities of the subscales

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Cronbach’s alpha¹</th>
<th>Test–retest²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived competence</td>
<td>0.91</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>RAI subscales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amotivation</td>
<td>0.88</td>
<td>0.33</td>
</tr>
<tr>
<td>External regulation</td>
<td>0.76</td>
<td>0.65</td>
</tr>
<tr>
<td>Introjected regulation</td>
<td>0.67</td>
<td>0.62</td>
</tr>
<tr>
<td>Identification</td>
<td>0.54 (0.78)</td>
<td>0.80</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
<td>0.92</td>
<td>0.72</td>
</tr>
<tr>
<td><strong>IMI subscales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enjoyment/interest</td>
<td>0.90</td>
<td>—</td>
</tr>
<tr>
<td>Effort/importance</td>
<td>0.76</td>
<td>—</td>
</tr>
<tr>
<td>Competence</td>
<td>0.89</td>
<td>—</td>
</tr>
<tr>
<td>Pressure/tension</td>
<td>0.95</td>
<td>—</td>
</tr>
</tbody>
</table>

¹N = 40.  
²N = 12.

Results

Reliability

Table I presents internal and test–retest reliabilities. Data for the latter were collected from 12 students 2 weeks after the first administration of the questionnaire. Internal reliability of the identification subscale was improved from 0.54 to 0.78 with the deletion of one item. Regarding test–retest reliability, only the amotivation scale had an unacceptably low level.

Descriptive and Correlational Analyses

Table II presents descriptive statistics for the psychological variables. Regarding the RAI subscales, reasons in the identification category were the ones most strongly endorsed, while those in the category of introjected regulation were the ones least likely to be supported.

Simple correlations are presented in Table III. Perceived competence is positively associated with intrinsic motivation, grade achieved and intention, while RAI is associated with intrinsic motivation but not with grade and intention.

TABLE II. Descriptive statistics for all psychological variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>5.34</td>
<td>1.26</td>
</tr>
<tr>
<td>Perceived competence</td>
<td>3.85</td>
<td>1.36</td>
</tr>
<tr>
<td>IMI</td>
<td>5.13</td>
<td>0.94</td>
</tr>
<tr>
<td>RAI</td>
<td>−0.54</td>
<td>5.94</td>
</tr>
<tr>
<td><strong>RAI subscales</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External regulation</td>
<td>4.55</td>
<td>1.77</td>
</tr>
<tr>
<td>Introjected regulation</td>
<td>2.96</td>
<td>1.36</td>
</tr>
<tr>
<td>Identification</td>
<td>5.14</td>
<td>1.27</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
<td>4.66</td>
<td>1.31</td>
</tr>
</tbody>
</table>

Motivation and Achievement
TABLE III. Correlation matrix between all variables

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Perceived competence</td>
<td>0.42*</td>
<td>0.67**</td>
<td>0.60**</td>
<td>0.53**</td>
</tr>
<tr>
<td>(2) RAI</td>
<td>0.34</td>
<td>0.57**</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>(3) Grade</td>
<td>0.74**</td>
<td></td>
<td>0.53**</td>
<td></td>
</tr>
<tr>
<td>(4) IMI</td>
<td></td>
<td></td>
<td>0.71**</td>
<td></td>
</tr>
<tr>
<td>(5) Intention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.01.
**p < 0.001.

Structural Equation Analysis

Structural equation analysis was employed in order to test the network of relationships between the variables. In structural equation modelling analysis, a causal model is hypothesised to account for the observed co-variances between the measured variables. This type of analysis holds an advantage over regression analytic approaches in that parameters of the model are assessed simultaneously, so excessive data analysis is avoided. In this analysis, the co-variance matrix of the observed variables is compared to the matrix implied by the hypothesised model. To the extent that these are not significantly different, as indicated by a chi-square distributed test statistic, then the fit of the data to the model is assumed to be adequate.

In the model that was specified, both perceived competence and relative autonomy (RAI) were hypothesised to influence both performance (as measured by grade) and intrinsic motivation. Moreover, paths were included from grade to intrinsic motivation and from intrinsic motivation to intention. Path coefficients for this model, as assessed by LISREL 6 (Joreskog & Sorbom, 1984), are presented in Fig. 1. The path from perceived competence to intrinsic motivation was not significant and neither was the path from RAI to grade. Table IV presents indexes of goodness of fit for this model. As can be seen, the fit of the model to the data is very good. The chi-square value was nonsignificant, implying that the hypothesised co-variances between the variables were not significantly different from the observed co-variances.

Although perceived competence did not have a direct effect on intrinsic motivation, it still had an indirect effect through performance grade. This effect can be estimated

![Diagram of structural model]

**Fig. 1.** Estimated structural model with standardised maximum likelihood estimates. Nonsignificant paths are not presented (p < 0.001). Straight lines depict hypothesised causal influence, while curved lines represent an unspecified relationship.
by multiplying the effects of perceived competence on grade by the effect of grade on intrinsic motivation \((0.63 \times 0.56 = 0.34)\). Also, the nonsignificant path from competence to intrinsic motivation was 0.1. Added together, the indirect and the direct effects give a total effect of perceived competence on IM of 0.44, which is reasonable.

**Discussion**

This study examined the effects of perceived competence and relative autonomy on intrinsic motivation utilising a prospective design. It was shown that university physical education students' perceptions of autonomy at the beginning of a course were predictive of intrinsic motivation at the end of the course. Thus, the more students approached the course with a sense of self-determination, the more they were likely to report that they found the course intrinsically motivating. This parallels results of Ryan and Connell (1989) and of Vallerand and Bissonnette (1992). However, contrary to what was hypothesised, perceived competence did not predict intrinsic motivation; instead, its effect was indirect through performance and indeed its total effect on intrinsic motivation was substantial. Nevertheless, it appeared that perceived autonomy was a stronger and more direct determinant of intrinsic motivation that perceived competence. This is in accordance with a point made by Deci and Ryan (1985) that perceived competence is related to intrinsic motivation only in the context of self-determination and, thus, perceived autonomy is a more critical factor for intrinsic motivation than perceived competence. That is, no matter how competent individuals feel, they would not be intrinsically motivated when engaged in activities under some form of pressure.

Further, intrinsic motivation was a strong predictor of intention. Students who reported high levels of intrinsic motivation in the course were more likely to report that they would take a similar course in the future. It appears that cultivating intrinsic motivation is an appropriate way to promote continuing involvement and behavioural persistence.

According to the results of this study, one way that this can be achieved is enhancing students' sense of autonomy. This can be achieved in various ways. Firstly, in order to create a true sense of autonomy in the students, they must be given a certain number of choices. These can be in the form of optional study material, different tasks, etc. Secondly, students should be given agency and control in the learning process. For example, in the course studied, students could teach and grade each other and this possibly led to increased levels of autonomy and intrinsic motivation. Thirdly, students should be given a rationale for their participation in the course. Providing meaningful
reasons to the students is likely to shift their behavioural regulation towards identification.

Although the results of this prospective study can indicate directionality between the concepts studied rather better than correlational studies, there is still room for uncertainty. Therefore, future investigations should manipulate perceived autonomy and/or perceived competence so that direction of influence could be established with greater confidence. Similarly, we do not wish to generalise beyond this small group of specialist students, although the results are consistent with research elsewhere, as discussed. Finally, the results may be of interest to teacher educators in terms of not only motivating their own students, but also in showing the links between complex motivational orientations and performance for students to consider in their own teaching.

Correspondence: S. Biddle, School of Education, University of Exeter, Heavitree Road, Exeter, EX1 2LU, UK.

NOTE

[1] In light of Ryan and Connell's model and due to the fact that amotivation had low test-retest reliability, it was omitted from the computation of RAI.

REFERENCES


