

Learning environment, motivation and interest: Perspectives on self-determination theory



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The relationship between university students' motivation and their learning environment is the focus of this article. Following self-determination theory (SDT) and the theory of interest, it is proposed that perceived support of basic psychological needs (support of autonomy, competence and social relatedness), as well as aspects of a constructivist learning environment (teachers' interest, relevance of contents, and quality of instruction, as well as transparency and fit of requirements) are associated with self-determined motivation and with study interest. The responses of a sample of undergraduate students in psychology ($N = 123$) to measures of these variables were analysed. The students were asked about their motivation to learn, their interest in psychology and about the perceived learning environment in psychology. The results showed that most of the students were motivated on an intrinsic and identified level, and displayed high study interest. Study interest, intrinsic motivation and self-determined forms of extrinsic motivation were particularly associated with perceived support of autonomy and competence, as well as with the relevance of the contents, the quality of instruction and with the perceived transparency of requirements.

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We need to create cohesive societies, and one of the best ways to do that is to have educational systems that increase such cohesion (Triandis, 2001, p.1)

Recent educational-psychological research has repeatedly highlighted the qualitative differences between intrinsically motivated and interested learners and extrinsically motivated learners regarding the learning process, as well as learning results. The

advantages of intrinsically and interest-motivated learning appear in improved cognitive and emotional outcomes as well as in the learners' identification with certain content areas of their studies (Deci & Ryan, 1994; Deci, Vallerand, Pelletier & Ryan, 1991; Koestner & Losier, 2002; Reeve, 2002; Schiefele, 1996; Schiefele, Krapp & Winteler, 1992). It is therefore obviously beneficial to design learning environments that promote intrinsically motivated, or interested learning. Unfortunately, there is still not enough knowledge about which environmental conditions are connected with motivation (Müller, 2001; Reeve, 2002). More is rather known about how motivation and interest can be undermined (Deci, Ryan & Koestner, 1999).

The study draws on a theoretical framework provided by Deci and Ryan's (1985, 1994, 2002) self-determination theory (SDT), as well as the educational-psychological theory of interest (Renninger, Hoffmann & Krapp, 1998). The assumptions of the SDT have been confirmed empirically in 'Western' cultures, as well as in countries such as Japan and Russia (Chirkow & Ryan, 2001; Deci & Ryan, 2002). Part of the interest in this study will be to examine empirically how useful the SDT is in a South African setting, and to explore the connection between learning environments and motivation.

The classic distinction between intrinsic and extrinsic motivation (Deci, 1975) provided the basis for Deci and Ryan's (1985, 2002) development of the so-called SDT. Intrinsically motivated behaviour represents the prototype of self-determined behaviours: 'They are perceived as wholly volitional, as representative of and emanating from one's sense of self, and they are the activities people pursue out of interest when they are free from the press of demands, constraints, and instrumentalities' (Deci & Ryan, 1994, p. 5). Intrinsically motivated behaviour is associated with curiosity, exploration, spontaneity and interest. An example of intrinsic motivation is the student who goes to class because she or he is interested and finds it satisfying to learn more about a certain subject. Extrinsically motivated behaviours are undertaken to attain an end state that is separate from the actual behaviour. The activity motive is determined by some external contingency such as good marks or the avoidance of negative consequences.

Recent studies have shown that there are forms of extrinsically motivated behaviour that can be self-determined. Deci and Ryan (1994, pp. 5–6) assume that 'extrinsically motivated behaviors become self-determined through the developmental processes of internalisation and integration'. In subsequent work they referred to it as the 'organismic integration theory' (Deci & Ryan, 2002, p. 9). Internalisation involves an individual's transformation of regulatory processes that are external to the self into internal regulatory processes. These now internalised values and regulations are integrated into and become part of one's self.

There are four types of extrinsic regulations that result from different degrees of internalisation and integration, namely, external regulation, introjected regulation, identified regulation and integrated regulation.

- a. *External regulation (ER)*: This kind of regulation depends on external contingency, for example, to attain a reward or to avoid negative feedback. External regulation can be described as the ‘classical’ extrinsic motivation.
- b. *Introjected regulation (IJ)*: Introjected regulation includes actions aimed at contingencies that relate to one’s self-esteem. For example, one studies in order to impress others, or because it is ‘right and proper’ to act in a certain way. The cause of action may come from the person himself or herself, yet is not controlled by the autonomous self; it is external to the person’s sense of self.
- c. *Identified regulation (ID)*: Here the focus is on the personal relevance of an action, for example, when a learner identifies with the values and tasks of a learning arrangement and also integrates them into his or her self. A student, therefore, may not be interested in the content of a discipline, but nevertheless consider the examinations to be important, because the self-set goal of mastering the content of the discipline is of personal importance to him or her.
- d. *Integrated regulation (IR)*: More than any other extrinsic motivation, integrated regulation depends on self-determination. ‘It results from the integration of identified values and regulations into one’s coherent sense of self’ (Deci & Ryan, 1994, pp. 6–7). These values coexist harmoniously along with other aspects of the self.

There is a set of behaviours that fall somewhat outside this framework, namely, amotivated behaviours (AMs). According to Deci and Ryan, this third type of motivational construct is important to consider in order to understand human (learning) behaviour fully. These ‘behaviors are energized and they are explicable, but they are not considered motivated because they are not regulated by intentional processes’ (Deci & Ryan, 1994, p. 3). In other words, students with high scores on the amotivated type of impulsion perceive their behaviours as caused by forces outside of their own control and start asking themselves why they go to university or school at all. Eventually they may drop out of academic activities altogether (see Vallerand et al., 1992).

These aspects of SDT have pedagogic relevance. For Deci and Ryan (1994), the development of external regulation (ER) into self-determined forms of regulation, as well as the maintenance of self-determined motivation, depends upon the satisfaction of the basic psychological needs of autonomy and competence. This means that the value of an activity, which is at first of no interest to the individual – that is, the person is not intrinsically motivated – can be integrated into the autonomous self through the support of autonomy and competence. Autonomy cannot be equated with independence, but rather has to be considered as a perceived consistency between inner values, what one wants and the environment. Deci and Ryan further maintain that the

integration of external prompts is supported by the interaction of the individual with significant other people (e.g. parents and teachers) or groups (social relatedness as a third ‘basic psychological need’). This natural tendency of active transformation of ER into self-determined regulation and its dependence on basic psychological needs is what makes the theory interesting for further research in education.

The second theoretical influence on the present research is the theory of (study) interest. Since its application in the 1970s and 1980s (for a summary see Schiefele, 1996), researchers have used it to describe and explain the processes and results of learning. Unfortunately, the concept of interest has been operationalised in so many ways that it is difficult to compare studies and to arrive at one definition. Apart from an individual difference approach, which appears especially in the field of vocational interest tests (Holland, 1992), the so-called educational-psychological theory of interest is applied mainly in the research of teaching and learning (Hoffmann, Krapp, Renninger & Baumert, 1998; Krapp, 2002; Renninger, Hidi & Krapp, 1992).

This theory defines *interest* – following historical approaches (Dewey, 1913) – as a specific relation between person and object. It differentiates between situational and individual interests. Whereas situational interest depends on time and situation, individual interest describes a relatively stable personality characteristic. This is based on the assumption that individual interest develops from repeated situational interest. High interest behaviours are accompanied by intrinsic motivation, positive emotional valence and a strong personal relationship with certain objects (e.g. a specific discipline at university) or actions (e.g. discussions in a special field).

There are a number of ways in which self-determination theory and the theory of interest can have pedagogic significance. Firstly, interested learners are more content in their learning processes, acquire knowledge in a more differentiated and more coherent form, show a long-term retention of what was learned, and apply their knowledge more often than others. Furthermore, interested and intrinsically motivated learners can cope better with the demands of the educational institution. They show higher academic achievement – especially over the long term – and also perceive themselves as more competent (Deci & Ryan, 1994; Deci, Vallerand, Pelletier & Ryan, 1991; Grässmann, Schultheiss & Brunstein, 1998; Reeve, 2002; Schiefele, 1996; Schiefele, Krapp & Winteler, 1992; Vallerand, Fortier & Guay, 1997; Williams & Deci, 1998).

Secondly, these theories predict certain relationships between the quality of educational processes and their effects, such as instructional designs that promote motivation and interest. Studies based on the SDT have shown that the satisfaction of basic psychological needs is an important precondition for the formation of self-determined motivation, and the development and maintenance of personal interest (Deci, Ryan & Koestner, 1999; Lewalter, 2002; Lewalter, Wild & Krapp, 2001; Williams & Deci, 1998). Instructional designs that promote motivation and interest include the following relevant conditions: (a) learners have options and some leeway in the learning process, which makes autonomous learning possible (for the ‘support of autonomy’);

(b) learners receive informative feedback on their learning processes and success (for the 'support of competence'); and (c) teachers accept their students, thus creating a friendly and relaxed learning atmosphere in which participants are treated with respect and loyalty, and in which co-operation is promoted (for 'social relatedness').

Further indications of motivationally relevant conditions can be found in constructivist instructional approaches (Collins, Brown & Newman, 1989). A constructivist perspective assumes that learning is an active, constructive, social process, which can be fostered, for example, by action-orientated and problem-based learning, by student-centred education, or by exploratory learning. In the field of higher education, Prenzel (1996) demonstrated the relation between features of a constructivist learning environment and forms of motivation (according to the SDT), as well as interest.

This article analyses the relation of student interest and motivation to the perceived conditions of teaching and learning at a South African university. It is also an exploration of the extent to which a group of South African psychology students displays self-determined motivation, or whether they rather learn heteronomously.

METHOD

Participants

Questionnaires were administered to 123 psychology students at the University of Cape Town (UCT) in August 2002. The students had a mean age of 20 years, and 19% were male and 81% female. The university asked about previous race categorisation, for equity purposes, and 27.6 % of the students were 'African', 17.9 % were 'coloured', 2.7% 'Indian' and 51.8 % 'white'. The majority of the students (94%) was in the first or second year of their studies.

Procedure

The students completed the questionnaires during a scheduled lecture period, as part of a series of lectures on personality. The completion of the questionnaires took up an entire 45-minute lecture period. Students were told that they would remain anonymous and they were assured that the individual data would not be made available to any lecturer or another third party. They were also offered the option of declining participation in the study or of withdrawing from the study at any time. Only 2% of the students decided not to participate. All questionnaires were completed under the supervision of an experienced researcher, who was not one of their lecturers.

Instruments

The variables of interest and the scales employed to measure them are presented below.

Motivation: We used several items of the Academic Motivation scale (Vallerand et al., 1992; see also Prenzel, 1996). According to Deci and Ryan (1994), five aspects of the motivation to learn are explored in this instrument (examples of items are given in Table 1).

Table 1. Examples of items measuring motivation to learn

Motivation	Examples of items
Amotivation (AM)	'I really feel I am wasting my time in university.'
External (ER)	'Without pressure from outside I would do less.'
Introjected (IJ)	'I have to give myself an inner push in order to continue learning in my studies.'
Identified (ID)	'I really want to become more competent and to develop my skills further.'
Intrinsic (IM)	'I really enjoy learning and working here.'

Study Interest: We used the Study Interest Questionnaire (SIQ) of Schiefele et al. (1993). It consists of 18 items, such as: 'I'm certain that studying my major has a positive influence on my personality' or 'After a long weekend or vacation I look forward to getting back to my studies'.

The *perceptions of the learning environment* in psychology (following Prenzel, 1996; cf. Müller, 2001) measured three aspects, referred to as *basic psychological needs* (see Table 2). The relevance of basic needs (of autonomy, competence and social relatedness) for the development of motivation and interest were described above.

Table 2. Examples of items assessing learning environment and basic psychological needs

Needs	Examples of items
Support of autonomy	'It is possible to organise the studies in accordance with one's own ideas and interests.'
Support of competence	'The advice provided by the lecturers is very helpful for my own learning process.'
Social relatedness	'The lecturers do actually not take care of the students' interests.'

Finally, *five variables*, based on constructivist instructional designs (see Table 3), were measured as well (see Müller, 2001; Prenzel, 1996).

Figure 1 presents a model of these variables, reflecting the theoretical considerations we raised above. The arrows in the model indicate the direction of the relationship. We can assume that there is a relationship between the perceived environment and motivation or interest, because highly motivated and interested learners always perceive learning environments in a more positive light than less motivated learners (Kromrey, 1994). Individuals' personal interest in their studies can be both a result of motivational processes and a precondition of (intrinsic) motivation and also of environmental perception. The relationship between interest and intrinsic motivation may therefore be recursive (Schiefele, 1996). In other words, a persistent appearance of

intrinsic motivation in psychology courses is an important precondition for the development of relatively stable personal interest in psychology. It is also probable that

Table 3. Examples of items assessing learning environment (based on a constructivist learning philosophy)

Variables	Examples of items
Quality of instruction	'In the courses, the same subject matter is being examined from different perspectives.'
Relevance of the contents	'I have the impression that the course contents have nothing to do with real life.'
Teachers' interest (enthusiasm)	'The lecturers in our department are not really interested in their subject.'
Transparency of the requirements	'Lecturers make it clear what is important and unimportant in the courses.'
Fit of requirement (here measured negatively, i.e. 'Overload')	'Too much is expected of me in the courses.'

students with a certain level of personal interest are learning in a more intrinsically motivated way than students with low study interest.

BASIC NEEDS

CONSTRUCTIVIST VARIABLES

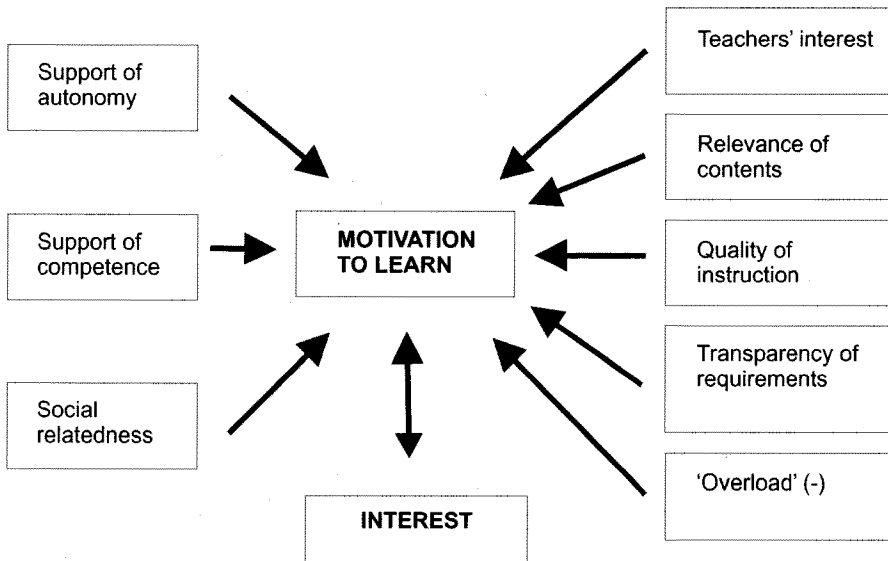


Figure 1. Situational conditions of self-determined and interested learning motivation (see Prenzel, Kramer & Drechsel, 1998).

RESULTS AND DISCUSSION

Table 4 presents an overall view of the participants' level of motivation, study interest in psychology and perceived environment. The reliability coefficients of the scales lie between 0.60 and 0.85, and are sufficient for group analysis. Two scales, IJ and transparency of requirements, however, delivered low coefficients (0.61 and 0.60, respectively); pointing to the need for a closer examination of the scales in future studies.

The students displayed a high level of the self-determined forms of extrinsic motivation (ID: identified), intrinsic motivation (IM), as well as study interest. The level of amotivation (AM) was low, as could have been expected, given the other high scores. Nevertheless, students were generally also considerably introjectedly (IJ) motivated, suggesting a low integration of academic norms, values and attitudes in relation to psychology courses.

Table 4. Descriptive statistics of the basic variables (N = 123)

Variables	Number of items	M	SD	Cronbach's Alpha
<i>Motivation¹:</i>				
Amotivation (AM)	3	1.90	0.87	0.72
External (ER)	3	2.27	0.90	0.69
Introjected (IJ)	2	3.42	1.04	0.61
Identified (ID)	2	4.17	0.69	0.76
Intrinsic (IM)	3	3.61	0.81	0.85
Study interest (SIQ) ²	18	2.00	0.46	0.84
<i>Perceived learning environment in psychology:</i>				
<i>Basic Needs:</i>				
Support of autonomy	4	3.64	0.80	0.74
Support of competence	4	3.90	0.64	0.81
Social relatedness	4	3.19	0.78	0.75
<i>Aspects of a constructivist learning environment:</i>				
Lecturers' interest	3	4.04	0.71	0.84
Relevance of contents	2	4.43	0.76	0.75
Quality of instruction	5	3.58	0.59	0.78
<i>Sub-scales:</i>				
Transparency of requirements	3	3.70	0.76	0.60
Overload	3	2.44	0.91	0.84

Notes: ¹After a confirmatory factor analysis, the items of motivation (AM, ER, IJ, IS and IM) present a clear five-factor solution and together explain 70% of the variance. ²Scale: 0 = disagree, 3 = agree. All other scales: 1 = disagree, 5 = agree.

The students regarded the motivation-relevant environments in a particularly positive light. This indicates that they felt supported in their basic needs for autonomy and competence, both in seminars and tutoring situations with lecturers. However, they had a lower opinion of their social integration into both the student and lecturer

environment. One reason for this could be the large number of students in the first-year course in psychology, as well as the fact that first-year students at a large university are still in the process of social integration into the university culture.

If we examine aspects of the learning environment in constructivist terms, the views of the learners are even more positive. The students gave positive ratings for the interest displayed by lecturers, as well as for the relevance of course content. The quality of instruction and the transparency of course requirements were positively assessed as well. Finally, it would seem that only a few students felt that they could not cope with academic expectations in their first year.

To illustrate these results and to provide an indication of what they may mean in terms of an evaluation of the academic environment, student ratings are given for a few selected items in Table 5:

Table 5. Perceptions of academic environment within the Psychology Department (item examples)

Items (respective scale in brackets)	<i>M</i>	<i>SD</i>
'... we are encouraged to bring our own ideas to the courses' (<i>support of autonomy</i>)	3.54	0.99
'... possible to organise the studies in accordance with one's own ideas and interests' (<i>support of autonomy</i>)	3.35	1.03
'in the studies I get an idea of my level of achievement' (<i>support of competence</i>)	3.67	0.91
'The advice provided by the lecturers is very helpful for my own learning process' (<i>support of competence</i>)	3.82	0.86
'I have the feeling of being accepted by my fellow students' (<i>social relatedness, students</i>)	3.82	0.91
'I am taken seriously by the lecturers' (<i>social relatedness, lecturers</i>)	3.18	1.13
'... the lecturers enjoy occupying themselves with the subject matter' (<i>lecturers' interest</i>)	3.96	0.89
'... the course content have nothing to do with real life' (<i>relevance of the contents</i>)	1.77	1.02
'... the same subject matter is being examined from different perspectives' (<i>quality of instruction</i>)	3.35	1.00
'I am not clear about what is expected of me in the courses' (<i>transparency of the requirements</i>)	2.19	0.97
'in my studies the volume of work is too high' (<i>overload</i>)	2.79	1.12

Note: Scale: 1 = disagree, 5 = agree.

There were significant gender differences in motivation (see Table 6), in that women displayed a significantly higher IM ($M = 3.66$) and less AM ($M = 1.80$) than their fellow male students (respective means = 3.26 and 2.23). Other studies too have found similar gender differences in self-determined motivation. Vallerand et al. (1992), for example, point out that female students display a more self-determined motivational profile than male students. One reason for this could be that women choose their studies more on the basis of personal interest and that extrinsic motives (such as status) are not that relevant to them. Women also perceived the lecturers as significantly more interested ($M = 4.11$) than men did ($M = 3.68$). This could be a result of their higher IM.

We examined the results in terms of 'language spoken at home' (Table 7). Compared with students whose home language is either English or Afrikaans,

students who speak an African language at home indicated that they struggled more with their studies. They perceived themselves as more ‘overloaded’ in their studies

Table 6. Significant gender differences for motivation and perceived learning environment

Variables	Overall		Male		Female		p	t-test		
	M	SD	M	SD	M	SD		t	df	
<i>Motivation:</i>										
Amotivation	1.90	0.87	2.23	1.03	1.80	0.83	<0.05	2.02	114	
Intrinsic Motivation	3.61	0.81	3.26	0.97	3.66	0.73	<0.05	2.16	114	
<i>Perceived environment:</i>										
Lecturers' interest	4.04	0.71	3.68	0.57	4.11	0.72	<0.01	2.61	112	

Note: Scale: 1 = disagree, 5 = agree.

than other students did. The differences in the self-reported academic performance in psychology between the groups bear this out (see Table 7, last line). Furthermore, compared with other students, the African-language group felt less socially integrated into their fellow students’ environment and the lecturers’ environment. In other words, black African students found it more difficult to achieve a satisfactory social and academic integration into the university culture. Indeed, in the open-ended section of the questionnaire, half of this group reported that they had to work harder in their studies, that they were cognitively overtaxed and that they generally experienced problems of social integration into the academic world. Often these problems were linked to the issue of inadequate financial resources.

Table 7. Significant ‘language’¹ differences for the descriptive statistics of the basic variables

Variables	Overall		African language		English/Afrikaans		p	T-test		
	M	SD	M	SD	M	SD		t	df	
<i>Perceived environment²:</i>										
Social relatedness (whole scale)	3.09	0.76	2.69	0.66	3.30	0.76	<0.01	3.31	100	
Social relatedness (Student–Student)	3.79	0.95	3.32	0.89	3.90	0.96	<0.05	2.58	103	
Social relatedness (Student–Lecturers)	2.98	0.82	2.47	0.71	3.09	0.83	<0.01	3.11	101	
Overload	2.37	0.90	3.01	0.97	2.20	0.76	<0.01	4.48	105	
Achievement (psychology course; in %)	66.5	8.1	59.3	8.4	68.1	7.2	<0.001	5.30	91	

Notes: Scale: ¹Item: ‘What language do you mostly speak at home?’ ²Scale: 1 = disagree, 5 = agree.

Tinto (1975) maintained that successful academic and social integration into a university system depends on pre-university schooling. For black African students, the university environment could be more 'foreign' than for their fellow students and could account for the lower social integration into the university system (see also Fourie & Strydom, 2000; Van Heerden, 1995). Although the proportion of African students in the South African higher education system has risen dramatically from only 20% in 1984 to more than 50% in 1998 (Cooper & Subotzky, 2001), it would seem that many African students come from families where they are the first generation at university (see Cloete & Bunting, 2000). Despite a finding of less social integration, this group of students is nevertheless just as highly motivated and interested as the rest, which may well have a compensatory effect.

Cluster analysis of motivation to learn and study interest

A centroid cluster analysis was made of the data regarding motivation to learn and study interest. Three types of motivational regulatory styles were found (Table 8). Individuals in Cluster 1 are intrinsically motivated ($M = 3.84$), and score high on 'regulation through identification' ($M = 4.12$) and study interest ($M = 2.13$).

Cluster 2 displays a higher level of AM ($M = 3.00$) and some forms of EM (ER $M = 3.25$; IJ $M = 3.68$). The individuals in this cluster also identify with the values and goals of the learning arrangements (ID $M = 3.45$).

Table 8. Clusters of motivation (M and SD of the cluster centers; ANOVA)

Motivation ¹ /Study interest	Cluster 1 (n=46)		Cluster 2 (n=24)		Cluster 3 (n=50)		ANOVA ¹	
	M	SD	M	SD	M	SD	F	P
Amotivation (AM)	1.63 ^a	0.54	3.00 ^b	1.04	1.65 ^a	0.55	38.94	<0.01
External regulation (ER)	1.80 ^a	0.64	3.25 ^b	0.76	2.22 ^a	0.78	28.83	<0.01
introjected regulation (IJ)	2.41 ^a	0.66	3.68 ^b	0.88	4.18 ^b	0.55	81.87	<0.01
Identified regulation (ID)	4.12 ^a	0.63	3.45 ^b	0.58	4.56 ^c	0.54	24.93	<0.01
intrinsic motivation (IM)	3.84 ^a	0.61	2.62 ^b	0.71	3.88 ^a	0.60	38.34	<0.01
Study interest ³	2.13 ^a	0.33	1.49 ^b	0.42	2.14 ^a	0.38	31.17	<0.01

Notes: ¹Procedure: Scheffé ($p < 0.01$); ²Scales: 1 = disagree, 5 = agree; ³Scale: 0 = disagree, 3 = agree. Superscripts a, b, c: different letter in one line = significant group differences (Scheffé); same letter = no significant group differences.

The majority of students ($n = 50$) can be assigned to Cluster 3. Like the individuals in Cluster 1, they can be described as students with high study interest ($M = 2.14$), high IM ($M = 3.88$) and identified motivation ($M = 4.56$). Yet, at the same time, Cluster 3 is introjectedly motivated ($M = 4.18$). In other words, these learners are interested in psychology, perceive themselves as eager learners, enjoy learning and identify with the goals of their studies. However, they learn, because of a 'bad conscience' and because this is 'what one expects from a good student'. These students put themselves under

pressure to fulfil their own self-expectations (ID) and also to fulfil external (social) expectations, which they have only partially internalised (IJ).

Other studies have provided similar evidence for mixed extrinsic and intrinsic motivation (Hwang, Echols, Wood & Vrongistinos, 2001; Lin, McKeachie & Yung, 2003; Wang, Chatzisarantis, Spray & Biddle, 2002). Hwang et al. (2002) showed in qualitative interviews that African-American university students can be highly intrinsically motivated, while at the same time displaying an equally strong extrinsic motivation, and a strong social and future orientation. At schools too, these authors found a motivation cluster with high IM and ID, as well as average IJ. Nevertheless, we have not been able to find a combination of high IJ, ID and IM in a degree comparable to Cluster 3 of these South African students. Indeed, Fazole and Fazole (1998) point out that, according to SDT, university students hardly show high values simultaneously on ID and IJ. A theoretical interpretation of the findings of the South African sample will be given later in this article.

Motivation, interest and perceived environment

The intercorrelation of motivational variables and interest were as expected (Table 9). AM and ER intercorrelate positively, as well as IM, ID and study interest. AM and ER are negatively associated with ID, IM and study interest. According to Deci and Ryan's (1985, 1994, 2002) definition of the construct, IJ rarely correlates with the other dimensions. Hence, IJ appears as a form of regulation that is only partially integrated into the self and therefore takes an intermediate position. The correlations thus show that the gradation of motivational regulatory styles applies to a continuum of self-determination for the South African survey as well. The correlation between study interest and the variables of the SDT also confirms the theoretical expectations.

In terms of the relation between perceived academic environment and the qualities of motivation and study interest – the main focus of this study – only relatively low correlations were found. Indeed, when compared with other studies involving the SDT with university students, the correlations in the present study appear to be lower (Müller, 2001; Prenzel, 1996). Despite this, the general tendency confirms the theoretical expectations. Study interest, IM and ID mainly correlated significantly and positively with the perceived environment variables. AM, ER and IJ correlated mainly negatively or they did not correlate at all (Table 9).

The perceived support of autonomy is particularly connected to ID ($r = 0.46$, $p < 0.01$) and not so much to IJ and IM (each $r = 0.19$, $p < 0.05$), whereas the perceived support of competence is associated with the two regulatory styles that are most strongly based on self-determination (ID and IM) ($r = 0.39$, $p < 0.01$; and $r = 0.29$, $p < 0.01$ respectively). Also, the learners who perceived support of their competence were rarely amotivated ($r = -0.29$, $p < 0.01$). Other studies also reported lower correlations between social integration and ID and IM, depending on the situation (for a summary, see Deci & Ryan, 2002).

Apart from the basic psychological needs, the variables describing a constructivist view of teaching and learning also correlated positively with self-determined forms of motivation. The perceived relevance of contents ($r = 0.32, p < 0.01$), the quality of instructions ($r = 0.29, p < 0.01$), as well as the transparency of requirements ($r = 0.30, p < 0.05$) are important for ID. In the case of IM, only the quality of instructions ($r = 0.26, p < 0.01$) and the transparency of requirements ($r = 0.29, p < 0.01$) are correlated. Teachers' interest and the relevance of the contents did not correlate significantly with IM.

Another point that was expected and confirmed was that extrinsically motivated students (ER and IJ) would be more likely to have problems coping with the demands of their studies (experiencing 'overload'). The inter-correlations between ER and overload ($r = 0.25, p < 0.05$) and between IJ and overload ($r = 0.25, p < 0.01$) were significant.

Study interest was associated with only one aspect of basic psychological needs, namely, with the support of competence ($r = 0.27, p < 0.01$). Interest is linked to three variables of the constructivist approaches: relevance of contents ($r = 0.25, p < 0.01$), quality of instruction ($r = 0.29, p < 0.01$) and transparency of requirements ($r = 0.32, p < 0.01$).

Table 9. Pearson correlations for the basic variables ($N = 123$)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Motivation/Interest:													
1. Amotivation	-												
2. Extrinsic	0.38**	-											
3. Introjected	0.11	0.35**	-										
4. Identified	-0.34**	-0.34**	0.14	-									
5. Intrinsic	-0.52**	-0.40**	-0.08	0.47**	-								
6. Study interest	-0.64**	-0.45**	-0.11	0.56**	0.60**	-							
Environment:													
7. Support of autonomy	-0.12	-0.05	0.19*	0.46**	0.19*	0.17	-						
8. Support of competence	-0.29**	-0.09	0.07	0.39**	0.29**	0.27**	0.41**	-					
9. Social relatedness	-0.07	-0.04	0.16	0.26**	0.21*	0.14	0.34**	0.31**	-				
10. Teachers' interest	-0.06	0.03	0.21*	0.20*	0.11	0.09	0.18*	0.30**	0.26*	-			
11. Relevance of contents	-0.25**	-0.22*	-0.05	0.32**	0.08	0.25**	0.26**	0.30**	0.13	0.28**	-		
12. Quality of instruction	-0.18*	-0.13	0.07	0.29**	0.26**	0.29**	0.21*	0.34**	0.7	0.27**	0.27**	-	
13. Transparency of requirements	-0.39**	-0.21*	0.01	0.30**	0.29**	0.32**	0.15	0.41**	0.05	0.29**	0.27**	0.30**	-
14. Overload	0.17	0.25*	0.25**	-0.03	-0.15	-0.07	-0.02	-0.15	-0.07	-0.07	-0.20*	0.04	-0.09

* $p < 0.05$; ** $p < 0.01$

It is noticeable that support of autonomy, social integration and teachers' interest did not correlate. Teachers' interest generally appeared to be of less relevance for the motivation and study interest of students.

The perception of the academic environment did not, as expected, correlate with AM and ER. In this survey, ER, in particular, hardly correlated with the perceived environment. Only the subjective relevance of contents and the transparency of requirements displayed significantly negative correlations with ER.

The effect of environmental variables

A step-wise multiple regression analysis was done to test the effect of the environmental variables on study interest and motivation. We used study interest, IM and ID as variables of interest here because of their educational relevance for high-quality learning.

The analysis presents various explanations for the environment variables as predictors for self-determined forms of motivation (ID and IM) and study interest. In all three models, the transparency of requirements shows a high level of explanatory power (see Tables 10, 11 and 12).

Table 10. Stepwise multiple regression for identified regulation (ID)

Predictors (perceived academic environment)	Adjusted R^2	ΔR^2	b	Beta	p
Support of autonomy	0.207	0.207	0.353	0.389	0.000
Transparency of requirements	0.246	0.039	0.168	0.179	0.031
Relevance of contents	0.263	0.017	0.159	0.161	0.051
(constant)			1.564		

$df = 3, 119$

Table 11. Stepwise multiple regression for intrinsic motivation (IM)

Predictors (perceived academic environment)	Adjusted R^2	ΔR^2	b	Beta	p
Transparency of requirements	0.091	0.091	0.327	0.314	0.001
Social relatedness	0.122	0.031	0.209	0.195	0.026
(constant)			1.574		

$df = 2, 117$

Table 12. Stepwise multiple regression for study interest

Predictors (perceived academic environment)	Adjusted R^2	ΔR^2	b	Beta	p
Quality of instruction	0.091	0.091	0.186	0.241	0.013
Transparency of requirements	0.121	0.030	0.129	0.207	0.034
(constant)			0.873		

$df = 2, 107$

Table 10 shows that with the help of the variables, support of autonomy, transparency of requirements, and perceived relevance of content, we can explain about 25% of the variance on ID.

The motivation data in this study can be interpreted in two ways. Firstly, high levels of self-determined motivation and study interest should be ideal preconditions for a high-quality learning process. Other studies indirectly support this interpretation and point out several positive learning effects of self-determined motivation and study interest (Reeve, 2002; Schiefele, Krapp & Winteler, 1992). Secondly, the

generally high level of study interest (in this case a relatively stable personality characteristic) should promote the maintenance of self-determined motivation (here as a construct dependent on the situation) over a longer period of time. Thus, study interest could be interpreted as a relatively stable precondition of self-determined motivation.

The cluster analysis produced a more differentiated picture of learning motivation and study interest. The finding that 42% of the students simultaneously displayed high IM and ID, as well as IJ (Cluster 3), is very interesting. At first sight, this seems irreconcilable with the SDT. '[The] introjected type of regulation is quite controlling,' stated Deci and Ryan (2002, p. 17); whereas ID and particularly IM describe forms of regulation based upon self-determination, and hence refer to values and norms that are deeply integrated into the coherent self of a person. It is therefore necessary to consider how it is possible that for over 40% of the students more extrinsically controlled regulatory styles (IJ) can coexist with regulatory styles based upon self-determination (ID and IM).

We have come to the conclusion that these findings can be interpreted in two ways: one referring to the situation when students begin their studies at university; the other considering extra-university factors.

Almost all the students who participated in this study were first-year students. This means that they are not yet familiar with the norms and values of the university, and the culture of academic departments. One can assume that they are still occupied with managing their studies and trying to cope with the demands of university study. Applied to the SDT and the present empirical findings, this means that the students have only partially integrated the values and norms of university culture into their 'self' after their first year of studies. This is why they exhibit a high level of IJ regulation. They put themselves under pressure in their attempts to avoid a 'bad conscience'. In other words, students can be interested in their subject and enjoy their studies, can identify with the goal of becoming a psychologist, while they still have only partially integrated the demands of the university culture and therefore have to motivate themselves repeatedly (IJ).

We believe extra-university factors might very well be involved here too. Factors such as the perceived job market for graduates, or difficult personal financial situations may result in students putting themselves under pressure. They may want to finish their studies within the prescribed time, as a degree is considered important for good career opportunities and social mobility. These factors could influence motivational processes at university in such a way that the students feel under pressure. In SDT terminology, students perceive their motivation as 'introjected'. Extra-university factors, therefore, could be one interpretation for the intrapersonal connection of self-determined motivation (IM and ID) and IJ regulation.

In combination, these two factors would make it understandable that for a group of students (42%, in Cluster 3) IJ regulation and intrinsic or identified motivation can coexist within the self, because of the pressure of adjusting to university life, and

external social and personal constraints. Further research focusing on students who interpersonally connect heteronomous and self-determined motivation is encouraged, if only to discover whether these are isolated results.

The intercorrelations of motivational variables confirm the differentiated design of extrinsic motivation according to the SDT and speak against the construction of learning motivation into polar opposites of pure extrinsic or intrinsic motivation. Altogether, self-determined motivation (IM and ID) correlated negatively with AM and ER. Confirming theoretical assumptions, IJ held an intermediate position on the continuum between heteronomy and self-determination. This so-called simplex structure of the continuum of autonomy was found not only in our data but also in different settings and different cultures (Ryan & Deci, 2000; Vallerand & Ratelle, 2002).

The students perceived the teaching and learning environment at university in a very positive light – especially the support of competence, the way lecturers conveyed interest in their own subject, as well as the personal relevance of contents. *Only one field of inquiry produced ambivalent results: at first-year level, there appeared to be only a limited integration of most of the black African students. We believe this fits in with a general picture at historically white South African universities, namely, that African students, in particular, experience difficulty with how they ‘fit in’.*

The second focus of the study was the relationship between the academic environment and learning motivation, or interest. Our findings confirmed the fundamental assumption that positive interpretations of basic needs, and aspects of a constructivist teaching and learning approach are accompanied by self-determined forms of motivation. Support of autonomy and competence, as well as social input, are associated with self-determined motivation. We could also demonstrate that some aspects of a constructivist learning philosophy are important conditions for self-determined motivation and interest.

Not all environmental fields are equally relevant for learning motivation and study interest. In our study, we used a stepwise regression analysis to identify aspects of the academic environment that are relevant for self-determined forms of motivation (ID, IM, and study interest). In our model, the analysis identified only the environmental variable ‘transparency of requirements’ as a generally relevant predictor for ID, IM and study interest. The best predictors for the identified type of regulation (ID) were transparency of requirements, the support of autonomy and social integration. These variables explained 26% of the variance on ID. For intrinsic motivation, only transparency of requirements and social relatedness were relevant and explained 12 % of the variance. Finally, the quality of instruction and transparency of requirements influenced the dependent variable of study interest. To summarise, the four environmental variables (transparency of requirements, social relatedness, relevance of contents, and quality of instruction) were relevant predictors for self-determined forms of motivation and for study interest. Obviously, the transparency of requirements plays a key role in the motivational process of these South African students.

Other research in the field of higher education produced somewhat higher inter-correlations between theoretically relevant environmental variables and motivation (Müller, 2001; Ntoumanis, 2001; Patrick, Hisley & Kempler, 2000; Prenzel, 1996). The relatively low correlations in our study are not without precedent, however. Under certain situational conditions, such as large classes with limited interaction between teachers and students, other studies produced low correlations as well (Berkel & Schmidt, 2001; Noels, 2001; Noels, Clement & Pelletier, 1999). Deci and Ryan (2002), too, point out that the three basic needs can correlate with motivational regulatory styles depending on situational or personal conditions (e.g. group-based learning, pre-knowledge, or social orientation of learners).

What, then, are the reasons for the relatively low correlation in this survey? In our opinion, there are three decisive factors. Firstly, the homogeneous (and thoroughly positive) interpretation of the university environment (especially for the support of competence and the relevance of the contents) by students this early in their studies may artificially constrain the intercorrelation, or effect sizes. It is possible that, over time, students may come to perceive their studies in a more differentiated light. It is also possible that, during the course of their studies, their perceptions of the learning environment may begin to vary more, which could make higher correlations between environment and motivation possible.

Secondly, aspects external to the university could very well play a part here as well. In South Africa, going to university is relatively costly and is perceived as a privilege that enhances one's future prospects. This may lead to a higher motivation at the start of the individual's studies, which can also be interpreted as relatively independent of perceived study requirements. An indication for this is the high identification of students with the goals of the course of study, as well as strong educational aspirations. Consequently, future research could focus on finding specific aspects of the environment that may or may not play a part here (cf. Guay & Vallerand, 1997; McInerney & van Etten, 2001).

Thirdly, variables related to individual differences in personality may also be relevant. We need to explore further whether relatively stable personality characteristics could enhance the explanation of the variance of motivation along with the perceived teaching and learning environment. Students with certain personality characteristics may be more open to interested or intrinsically motivated learning.¹ First indications for a confirmation of this thesis were provided by a different sample, which showed that (depending on the course of studies) a combination of personality characteristics and assessed academic environment produced a better explanation for the variation in motivation and interest (Müller, 2001).

CONCLUSION

The aim of this study was to analyse the quality of learning motivation, and to link it to aspects of the teaching and learning environment. Overall, we found that most of

the students exhibited intrinsic and identified learning motivation, and rated highly on study interest. Only a few students were amotivated or exclusively extrinsically motivated (in the sense of extrinsic regulation).

It is generally difficult to derive practical indications from correlational studies, especially when – as it is the case in this study – the correlations are on the low side. In addition, we have to assume a dynamic interaction between motivation and environment (Fazey & Fazey, 1998; Kromrey, 1994). One would have to conduct ‘ecological experiments’ to substantiate the practical impact of the analysed aspects of environment. In other words, one would have to form teaching and learning environments according to the theoretical assumptions (basic needs and constructivist learning environments), and then examine their effects on motivation. Benware and Deci (1984), for example, could detect in a natural setting a high positive effect of autonomy-supportive *versus* controlling instructions at university. In our opinion, future studies should focus on this kind of research.

This notwithstanding, we are able to offer some practical indications on the basis of the results we have at hand:

- a. The very positive perception of the academic environment within a particular department indicates little need for major change. The transparency of academic requirements in the first year of study, for example, is particularly suitable for the promotion of motivational processes. The clearer the requirements at the start of the studies, the easier it is to maintain the initial motivation.
- b. We do not want to idealise intrinsically motivated and interested learning, or regard it as the ideal way for all pedagogic approaches (Weinert, 1996). At institutions of formal education, where individuals meet external demands, one’s learning does not and cannot be based exclusively upon intrinsic motivation. We have to consider the personalities and the variety of interests and education motives of the learners. The SDT underlines that self-determined, motivated learning enhances learning quality, promotes identification processes and subjective meaning, and is therefore a desirable pedagogic goal. Furthermore, constructing the learning environment according to basic needs (e.g. through the support of autonomy and social relatedness) enables self-determined motivation or – and this is pedagogically just as important – at least maintains it (evidence for this was provided by the correlations in this study). Extrinsic motivation is not to be excluded. Extrinsic motivations that do not restrict autonomy may promote the integration of external demands. Hence, for example, one cannot in general reject external agreements about goals, schedules and student reports. If the individual perceives them as subjectively sensible and if they support autonomy, then – according to the SDT – they can even support the processes of internalisation.
- c. The relatively low correlations and R-square results do not indicate that the components of the environment are of a low practical consequence for motivation processes. Several studies in fact show the opposite, namely, that the limitation

of, for example, autonomy and support of competence, undermines existing self-determined motivation (Deci, Ryan & Koestner, 1999). Constructing learning environments on the basis of basic needs and a constructivist teaching and learning environment at least promotes the maintenance of intrinsically motivated and interested learning. To ignore these principles would mean to destroy these important preconditions for high-quality learning and personal adjustment.

NOTE

- 1 Csikszentmihalyi (1975), for example, sees in the concept of *autotelian personality* basic personality characteristics, such as openness or risk-taking as requirements of flow experience or intrinsic motivation independent of situation. See Kuhl's references (2001) to the interaction of Big Five personality inventory and self-regulation processes.

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