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Exploring perspectives for improving students' motivation in pre-vocational secondary education

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Chapter 3

Multiple content goals in the classroom: A validation of the Goal Identification and Facilitation Inventory (GIFI)

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Abstract

In this study the validity and reliability of the Goal Identification and Facilitation Inventory (GIFI), a self-report questionnaire on goals for educational purposes, was tested. The GIFI, based on the goal taxonomy by Ford and Nichols (1987), aims to measure the salience of students' multiple content goals in the classroom. Students from pre-vocational secondary education (N = 511, mean age = 16.12, 56% boys) completed the GIFI. Two models were tested. After some adjustments, SEM analyses with EQS 6.2, showed a reasonable fit for the 16 factor model. The model was confirmed by a cross validation and proved to be gender invariant. A multilevel analysis revealed that class membership slightly influenced students' striving for the goals Tranquility, Superiority, Self-determination, and Resource Provision. Implications of these results will be discussed. Some goals proved to have some predictive validity for the basic motivational outcomes effort and pleasure.

Keywords: multiple goals, goal salience, measurement instrument, cross validation.

3.1 Introduction

Goals are defined as consciously articulated, personally meaningful objectives that individuals pursue in their daily lives (Sheldon & Elliot, 1998), or, as Wentzel (1999) puts it more prosaically “a cognitive representation of what it is an individual is trying to achieve in a given situation” (p. 77). Goals influence motivation; they direct, energize, and regulate behaviour (Austin & Vancouver, 1996; Emmons, 1989; Ford & Ford, 1987; Little, 1999; Klinger & Cox, 2004). In educational settings, goal research mainly focuses on learning goals and social goals, studying the why of goals. However, it has long been theorized that human behaviour is determined by a wider range of goals a person sets and pursues, also referred to as personal content goals (Ford & Nichols, 1987), higher order goals (Carver & Scheier, 2000), ‘be goals’ (Pintrich, 2000a), life goals (Deci & Vansteenkiste, 2004), personal projects (Little, Salmela-Aro, & Phillips, 2007), or multiple content goals (Boekaerts, 1999a; 2009). We assume that more knowledge of what it is a student wants to achieve, and the importance attributed to multiple content goals that are pursued in the classroom, provides us with a better fit between goal theories and students’ reality. Consequently, we expect to accomplish a more thorough understanding of their motivation for learning. Furthermore, knowledge of students’ goals enables us to identify goals that compete or support each other. This is important in the light of studies on the training of motivational self-regulatory skills, e.g. to coordinate the pursuit of multiple content goals (Boekaerts & Corno, 2005; Boekaerts & Niemivirta, 2000; Wentzel, 1999).

Researchers from the Psychology Department at the Leiden University developed a questionnaire, based on Ford and Nichols’ goal taxonomy (1987), to study multiple content goals in relation to health (Maes, Sweeney, & Gebhardt, 1998). This questionnaire was further developed by De Koning, Boekaerts en Zeijl (2001) for research on e.g. goal preferences in relation to school identification (De Koning & Boekaerts, 2005), and

cooperative learning (Hijzen, Boekaerts, & Vedder, 2006). This resulted in the Goal Identification and Facilitation Inventory (GIFI). This study aims to validate the GIFI.

First, we briefly discuss some established theories on learning goal orientations, social goals, and social goal orientation. Second, in line with developmental psychology, we argue that students pursue a wider range of goals that influences their motivation for learning. Third, we describe the validation of the GIFI.

Learning goal orientations

In the field of educational psychology, Achievement Goal Theory is the leading framework in research on goals (e.g., Ames, 1992; Dweck & Leggett, 1988; Elliot & Harackiewicz, 1996; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002a). This theory focuses on various learning goal orientations. Mastery orientated students wish to gain competence (mastery approach orientation), or avoid doing less well than before (mastery avoidance orientation). Students with a performance orientation, on the other hand, wish to show their competence and outperform peers (performance approach orientation), or avoid looking incompetent (performance avoidance orientation). For reviews we refer to Hulleman, Schrager, Bodmann, and Harackiewicz (2010), Linnenbrink (2005), and Maehr and Zusho (2009).

Ample evidence proves that a mastery approach orientation has positive effects on e.g. the use of effective strategies, a feeling of competence, interest, well-being, and pleasure. It does, however, not affect exam scores or grade point average (e.g. Bereby-Meyer, Moran, & Unger-Aviram, 2004; Harackiewicz, Barron, Tauer, & Elliot, 2002b). A mastery avoidance orientation undermines affect and interest, related to schoolwork (Cury, Elliot, Da Fonseca & Moller, 2006). A performance approach orientation is positively related to persistence, affect, and performance (Harackiewicz at al., 2002a; Harackiewicz at al., 2002b; Linnenbrink,

2005), but can also cause fear of failure and resistance against cooperative learning (Midgley, Kaplan, & Middleton, 2001). A performance avoidance orientation, on the other hand, is maladaptive for students' motivation, and has negative effects on e.g., their feeling of competence, engagement, and achievement (Ames & Archer, 1988; Elliot & Church, 1997; Urdan, Ryan, Anderman, & Gheen, 2002).

Elliot, Murayama, and Pekrun (2011) extended the model. They state that the mastery goal orientation can be task-based, directed at the demands of the task, or self-based, dealing with intrapersonal growth. The competence goal is other-based, directed towards comparison with others and interpersonal growth. The model showed a good fit. Other researchers, however, raised questions on the performance approach orientation: in their studies students state they want to perform, but not outperform others (Brophy, 2005; Mansfield, 2010).

Social goals and social goal orientations

Wentzel acknowledged that the classroom is not a mere context for learning, but also an environment with powerful social interactions. Studies with Asian students (mean age 13.45) showed that social goals explain a unique part of the variance when controlling for mastery and performance goals (King, McInerney & Watkins, 2010; King & Watkins, 2012; Mansfield, 2010). Moreover, the social goals students pursue, partly explain their academic performance. For example, the striving to behave in a pro-social way, be compliant and cooperative, is positively correlated with academic performance (Wentzel 1991, 1994, 1996a, 2000). Likewise, Mansfield and Wosnitza (2010) found a positive relation between mastery goals, and relationship and responsibility goals for students aged 12 to 13. On the other hand, high scores on entertainment goals, and resistance against social acceptable behaviour and classroom standards, co-occurred with the lowest achieving students. These goals have detrimental consequences for learning and achievement (Ryan, 2001; Wentzel, 1993).

Several researchers (Horst, Finney, & Barron, 2007; McInerney, Hinkley, Dowson & Van Etten, 1998; Urdan & Maehr, 1995; Wentzel & Wigfield, 1998) advocated further research on the relation between social goals and learning goals, that is, social goal orientations. Studies by e.g. Dowson & McInerney (2003, 2004) confirm that students combine these goals, illustrated by statements like “I want to get good marks so that I can become popular and not have to be at the bottom of my class”.

Multiple content goals

However, there is no reason to assume that students confine themselves to academic and social goals in the classroom, leaving other goals in their locker until the school bell marks the end of the school day. The role of multiple content goals has become even more explicit with the change from traditional to new forms of learning. These forms grant students more autonomy and often include collaborative learning, thereby providing more opportunity to pursue learning and non-learning goals in tandem, within educational settings (Boekaerts, 2003; Boekaerts, De Koning, & Vedder, 2006; Hijzen, Boekaerts, & Vedder, 2006).

Findings on the effect of striving for multiple content goals are diverse. According to Ford (1992) behaviour steered by several goals simultaneously, generates strong motivation and increases the chance to achieve the desired consequences. Kiviniemi, Snyder and Omoto (2002), however, stated that behaviour instigated by several goals, can also lead to less favorable consequences, such as stress, and decreased well-being. Indeed, well-being goals can compete with mastery goals, drawing attention and energy from learning goals (Boekaerts & Corno, 2005; Boekaerts & Niemivirta, 2000). On a more concrete level, Fries, Schmid, Diets, and Hofer (2005) showed that a striking almost 90% of the students (mean age 13.8) reported conflicts between school goals and leisure goals. Lemos and Gonçalves (2004) found proof for both effects: students reported that goals can both support each,

compete, or simply coexist. We can conclude that goals do not, as a matter of fact, stand on their own. To enhance our understanding of motivation in the classroom, we should study a wider range of goals ‘en groupe’.

Ford and Nichols’ goal taxonomy covers 24 multiple content goals (see table 1). It describes ‘the basic content of the purposes, desires, and concerns that motivate human behaviour’(Ford & Nichols, 1987, p. 85). These higher order goals or the ‘I want to be goals’ (Ford, 1992), represent the characteristics or the state of being a person desires, in order to establish the ideal self (Carver & Scheier, 2000) or possible self (Peetsma & Van der Veen, 2011). In a qualitative study, for example, the higher order goals mastery and performance serve the interest of e.g. ‘an enjoyable and successful career’ (Mansfield, 2010; p.48). Ford maintained that each of the higher order goals consists of a set of cognitions that steers the selection of more specific task related sub goals, also referred to as action programs, or ‘do goals’; they direct striving to reach the higher order goal.

Within the taxonomy of higher order goals, Ford and Nichols do not deem some goals more important than others, they do not position goals opposites ends of a continuum as Schwarz and Bardi (2001) suggest, nor are they formulated as a means to reach other goals as is the case in e.g. social goal orientations (Dowson & McInerney, 2003, 2004). The goals a person pursues and the importance that is attached to these goals, is determined idiosyncratically, characteristic for the individual (Ford, 1992, Ford & Nichols, 1987; Sheldon & Elliot, 1999).

Table 1 *Ford and Nichols goal taxonomy*

<i>Goal</i>	<i>Description</i>
Goals referring to the relation between person and environment	
Integrative social relationship goals	
Belongingness	Building or maintaining attachments, friendships, intimacy, or a sense of community and social identity. Avoiding feelings of social isolation or separateness.
Social responsibility	Fulfilling social roles, effort in keeping interpersonal commitments, conforming to social moral–cultural rules, often independent of close relationships. Avoiding social transgressions and unethical or illegal conduct.

Equity	Promoting fairness, justice, and reciprocity. Avoiding unfair or unjust actions.
Resource provision	Providing support, assistance, advice, and validation for others. Avoiding selfish or uncaring behaviour.
Self-assertive social relationship goals	
Individuality	Feeling unique, special, or different. Avoiding similarity or conformity with others.
Self-determination	Experiencing a sense of freedom to act or make choices. Personal control, freedom, autonomy. Avoiding the feeling of being pressured, constrained, or coerced.
Superiority	Comparing favourably to others in terms of winning, status, or success. Social status or importance, dominance, and winning. Avoiding unfavourable comparisons with others.
Resource acquisition	Obtaining approval, support, assistance, or advice from others. Avoiding social disapproval or rejection.
Task goals	
Mastery	Improving one's performance or meeting a standard of achievement. Avoiding incompetence and decrements in performance.
Management	Maintaining order, organization, or productivity in daily life tasks; handling routine tasks, organizing people or things, or being productive. Avoiding inefficiency, sloppiness, or disorganization.
Material gain	Obtaining or accumulating money or tangible goods. Avoiding the loss of money or material possessions.
Safety	Being unharmed, physically secure, and free from risk. Avoiding threatening or depriving circumstance.
Task creativity	Inventing new processes or products. Avoiding tasks that do not provide opportunities for creative action.
Goals referring to the person	
Affective goals	
Entertainment	Having fun, seeking heightened arousal, or avoiding boredom.
Tranquillity	Experiencing peace of mind, serenity, and avoiding stress.
Happiness	Experiencing feelings of joy, satisfaction, or well-being.
Bodily sensations	Experiencing particular bodily sensations or experiencing physical movement. Highs a person wishes to experience or unpleasant sensations a person would like to avoid. Short-term consequences.
Physiological well-being	Experiencing desired physiological states or feeling healthy. Long-term consequences.
Cognitive goals	
Positive or confirmatory self-evaluations	Experiencing self-efficacy, self-esteem, self-acceptance, or self-worth.
Understanding	Ordering, categorizing, explaining, or making sense.
Exploration	Experiencing curiosity, intellectual stimulation, or learning.
Intellectual creativity	Inventing new ideas or expanding one's limits.
Subjective organization goals	
Unity	Seeking coherence, harmony, or oneness.
Transcendence	Rising above ordinary experience, pursuing an idealized state, or spirituality.

Note. This table is adapted by De Koning, Boekaerts and Zeijl (2001).

3.2 Development of the GIFI

De Koning, Boekaerts en Zeijl (2001) operationalized Ford and Nichols' goals for educational purposes, using several action programs per goal. For each of the 89 items the

questionnaire asked how important the specific goal is at this moment in students' life (salience identification) and to what extent students consider it possible to attain that goal in the present school context (goal facilitation).

The questionnaire was adapted (Boekaerts, 2009); some goals formulated by Ford and Nichols were either too abstract or outside vocational students' everyday school world. For example, students reported that the goals Unity and Transcendence were not part of their reality and would not be taken seriously by their peers. This also applied to the goals Bodily Sensations and Physiological Well-being. Bodily sensations might be a sensitive subject for young adolescents and they may be too young to appreciate the importance of physiological wellbeing. These goals were omitted from the GIFI. Hence, the first version of the GIFI measured 20 goals, and was administered to students in secondary vocational education. In first testing of the questionnaire, another four goals did not emerge as separate goals; Items for the goals Understanding and Exploration seem to be taken in by the goal Mastery, and the goals Intellectual Creativity and Task Creativity did not seem to be meaningfully rooted in the reality of vocational students. The goal Happiness seemed to be taken in by the goals Entertainment and Tranquility. By contrast, Equity items split up into the goals Equity Parents and General Equity, reflecting the importance of parents in these students' everyday life. These adaptations resulted in 16 goals (see Boekaerts, 2009). The aim of the present study is to validate the current version of the GIFI for students in pre-vocational secondary education.

3.2 The Present Study

We tested two models. First, we hypothesized a first order factor model of 16 goals measured with 59 items with all factors correlated (De Koning, Boekaerts & Zeijl, 2001). Furthermore, we hypothesized that the 59 items will show the highest loadings on their corresponding 16

latent factors (model A). Second, some studies showed that the goals Individuality, Superiority, and Material gain take a different position from the other goals (Boekaerts, 2009; Smit, Boekaerts, & Busing, 2010). We hypothesized that these goals are perceived as a group, which we labelled as ego goals following Boekaerts (2009), alongside non-ego goals. Consequently, we tested a model (Model B) with a second order factor for ego goals. Bear in mind that we used the term ego goals differently than intended by Kaplan and Maher (1999) who used the expression ego goals as a synonym for performance goals in achievement goal theory. Finally, the best fitting model was cross validated and tested on gender and class invariance.

Gender invariance. Although the results are inconclusive, several studies indicate differences in goal appreciation between males and females. Female students showed more preferences for mastery goals (Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Hijzen, Boekaerts & Vedder, 2006), whereas male students attached more importance to Relatedness, Autonomy (Martin, 2003; 2004), and Superiority (Hijzen, et al, 2006). Furthermore, girls scored higher on prosocial behaviour (Wentzel, Battle, Russell & Looney, 2010), whereas boys reported higher on social status goals (Andermann & Andermann, 1999). Sound interpretations of gender differences in goal appreciation require similar interpretation of the questionnaire by males and females. Therefore, we tested the invariance of the GFI across gender.

Class effect. Data from individual respondents are often nested in larger structures. In educational settings data of students are nested in, for example, classes and schools. The assumption is this may influence the scores of individual students. According to the social-cognitive perspective, the goals students pursue, are not determined fully idiosyncratic, but partly by social and contextual factors (Bandura, 1986). Teacher behaviour and classroom climate influence students' goal orientation (Ames, 1992; Hijzen, Boekaerts, & Vedder,

2006; Meece, Anderman, & Anderman, 2006; Wentzel, Baker, & Russell, 2012). Also, the goals that significant others pursue can influence one's engagement (Edwards, 2006); classmates who are resistant to school norms, for example, can affect their peers motivation for learning negatively (Nelson & DeBacker, 2008). Furthermore, Hijzen, et al (2006) showed differences in goal preferences between the various program types; the program ICT/engineering, for example, scored higher on the Superiority goals and lower on the Mastery and Social Support goal, compared to other programs. To distinguish effects, e.g. mean differences, that can be attributed to the individual and to class membership, multilevel analyse are used more and more often. However, valid interpretations of class differences in goal appreciation require invariance across classes, indicating that different classes interpret the questionnaire similarly. Therefore we tested whether the questionnaire is invariant between classes, testing the goal structure with a multilevel analysis (Byrne, 2006; Hox, 2002).

3.3 Method

3.3.1 Participants

Data were gathered in three schools for pre-vocational secondary education in an urban area in the Netherlands. Pre-vocational secondary education prepares students in four years for vocational training. Assignment to this type of secondary education is mainly based on an entrance test in the final year of primary education. In the Netherlands, about 60 % of the students are referred to pre-vocational secondary education; these are the children with the lower test results

The questionnaire was completed by 511 students (mean age = 16.12, SD = .82, 46% boys) in 32 classes and 9 departments: ICT, Sport, Services & Security, Health & Wellbeing, Retail & Administration, Graphics & Media, Mechanics, Beauty Care, Construction, and

Electrical Engineering. One student refused to participate and six cases with predominantly missing values were deleted, resulting in a total sample of 504 respondents in the analyses.

Procedure

Students participated with informed consent from their parents. The researcher introduced the research to the students and administered a paper and pencil version of the GIFI. Anonymity was guaranteed. The questionnaire was completed during school time in, on average, 30 minutes, in the presence of a teacher and the researcher.

3.3.2 Instruments

The GIFI consists of 59 items representing 16 content goals, and aims to measure individual preferences and perceived facilitation. In this study, we focused on goal preferences. Students were asked how important each goal was to them, measured on a five point Likert scale (from 1 = not important at all to 5 = very important). The questionnaire was pre-tested; 100 students were interviewed in groups of five about word comprehension and relevance. We first asked about their most important goal in school. 99 of the 100 students replied 'getting my diploma', often followed by 'having fun at school, otherwise it is difficult to get your diploma'. Students reported that all goals they considered relevant were included in the GIFI, except possibly the goal 'having a good relationship with family' next to 'having a good relationship with parents'. Furthermore, the goals measured by the GIFI made sense to most students, although they did not consider the ego goals to be very important. When asked which goals were not applicable to them, they almost unanimously referred to 'superiority'. To check the social desirability of this response, the researcher then asked whether they thought this goal was important for any of their peers. That was confirmed, but it concerned one specific person only. Questions about word comprehension resulted in changing one word into a word with an unambiguous meaning.

Pleasure and interest were measured with one scale, in line with the IMI, with six items (e.g., 'I think schoolwork is fun). Also derived from the IMI, effort was measured with 5 items (e.g., 'I put a lot of effort into schoolwork').

3.3.3 Data analyses

The data were analyzed by means of structural equation modelling, using EQS 6.1 (Bentler, 2005). Maximum likelihood estimation was used to estimate the parameters. Given that we treated the data at a quasi-interval measurement level, we used covariance analyses. Structural equation modelling compares the covariance matrices of the hypothesized model with the covariance matrices of the actual data, examining relationships between observed and latent variables to determine whether the hypothesized model is consistent with the response (Byrne, 2006). The validation was executed in five steps. First, we tested the factor structure of the hypothesized models on a randomly selected half of the data set, the training set. Second, we performed post-hoc modifications, provided they were theoretically sound, in order to improve the model. Third, the modified model was tested on the other half of the dataset, the test set. Fourth, we performed a cross validation, and gender and class invariance were tested. Finally, the predictive validity of the goals for motivational engagement, i.e. pleasure/interest and effort was tested.

Fit indices

To assess the fit of the models, we used the fit measures formulated by Byrne (2006). A non-significant chi square indicates a good fit, but, as chi square is sensitive to sample size, chi square divided by the degrees of freedom is also used; values below 3, preferably below 2, indicate a good fit. CFI scores above .90 are acceptable, whereas scores of .95 and more

indicate an excellent fit. The RMSEA value should be as small as possible ($< .08$, preferably $< .05$) within a small confidence interval (CI) and interval values close to 0.

Differences between the hypothesized factor structure and post-hoc modified models are assessed with a chi square test; a non-significant test implies that the modified model does not differ from the hypothesized model, hence the more restricted model has to be preferred. Invariance was tested by inspecting the difference between the CFI values; a difference of < 0.01 between the more constraint model and the baseline model (configural model) indicates that addition of constraints did not result in a solution worse than the baseline model; hence, the model is invariant (Byrne, 2006). Finally, the AIC is used to compare non-nested models; the smaller AIC value indicates a better fit. As the data are partly skewed, we will use the robust method and robust fit measures that are provided by the EQS program and have been corrected for non-normality.

3.4 Results

3.4.1 Data inspection

Analyses showed that the data are skewed; students rate most goals as quite important (table 3), which concerns especially Equity Parents (EQP), but also Self Determination (SDT), Belongingness (BEL), Entertainment (ENT), General Equity (GEQ) and Positive Self Evaluation (POS). Individuality (IND) and Superiority (SUP) are considered least important, but the standard deviation is quite high, indicating there are students who deem IND and SUP quite important. Correlations and VIF values indicated no multicollinearity. Missing values do not exceed 2 %, but they are, according to Little's MCAR test, not missing completely at random. Especially items on the safety goal have relatively many missing values; questions about the use of alcohol, drugs, and avoiding trouble, obviously are sensitive to non-response, although anonymity is guaranteed. According to Scheffer (2002), even when data are not

missing completely at random, the mean and standard deviation from imputed data hardly differ from non-imputed data, as long as the missing values do not exceed the five percent. We used maximum likelihood estimation to deal with missing values.

3.4.2 Testing the fit

Testing Model A

To test the fit of the hypothesized first order model, 16 factors with all factors correlated (A1), we performed the analysis on a random half of the dataset (training set, N = 248, 48 % boys). It showed a weak fit ($\chi^2/df = 1.5$, CFI = .885, RMSEA = .045). Some post-hoc modifications were made, provided they were theoretically sound. First, the factor loadings were inspected to determine whether the items attributed sufficiently to the solution. Two items with high standardized residuals and small factor coefficients ($<.40$) were removed from the model. Second, based on the Lagrange Multiplier Test, two parameters were added. An item on the management goal also explained variance for the mastery goal, and vice versa. However, after adding these two parameters, both items appeared to have higher factor loadings on the factor other than hypothesized; obviously, the items did not discriminate sufficiently and were removed. Furthermore, for the item 'it is important to me to keep the feelings of classmates into account' (general equity goal), a parameter is added for the resources provision goal; students perceived equity also as providing help. Further modifications, suggested by the program, did not make sense, and therefore, were not executed. After these post-hoc changes, the model (A2) showed a reasonable and significant better fit; $\chi^2/df = 1.40$, CFI = .911, RMSEA = .042; $\Delta \chi^2 (df)$, $p < .001$.

Testing Model B

To test the fit of the hypothesized alternative second order model, we performed a CFA on the training set, containing 13 first order factors for the non-ego goals and a second order factor for the ego goals individuality, superiority, and material gain. The fit for this model was not satisfactory (B1; $\chi^2/df = 1.51$, CFI = .88, RMSEA = .046). The post hoc modifications did improve the fit significantly (B2; $\chi^2/df = 1.43$, CFI = .90, RMSEA = .043; $\Delta \chi^2 (df)$, $p < .001$), but did not exceed the fit of model A2. Therefore model A2 is preferred and, consequently, all further analyses are based on model A2. For an overview of the fit measures, see table 2.

Cross validation and invariance (A3, A4, A5)

Modification of models can lead to capitalization on chance, resulting in a model that “is only fitted to some peculiarities of the given sample” (Schermelleh-Engel, Moosbrugger, & Muller, 2003, p. 62). Therefore, we cross validated model A2 on the second random half of the dataset, (test set, $N = 258$, 43 % boys). This showed a reasonable fit (A3; $\chi^2/df = 1.30$, CFI = .931, RMSEA = .035); the adjusted model is quite stable across both sets.

Furthermore, we tested invariance across the data sets. In the configural model the parameters that initially were estimated for each dataset separately are estimated simultaneously in a multi group analysis without constraints, testing the similarity of the numbers of factors and the patterns of parameters across both datasets. The fit of the configural model was reasonable (A4, $\chi^2/df = 1.34$, CFI = .921, RMSEA = .038); the factor structure is fairly invariant.

To ensure that an instrument is equivalent across samples, the metric invariance was tested (measurement model); the factor loadings and factor correlations were constrained to be equal across groups. The fit measures were reasonable (A5, $\chi^2/df = 1.35$, CFI = .920,

RMSEA = .038). Furthermore, when comparing the fit of the measurement model with the fit of the configural model, the difference in CFI value is minimal (< 0.01); the relationships between constructs are invariant across both sets.

The reliability of the scales is good to high, except for the goal Resources Acquisition (see table 3). Available identical or comparable scales used in other studies (De Koning & Boekaerts, 2005; Hijzen, Boekaerts, & Vedder, 2006; Vedder, Kouwenhoven, & Burke, 2009) showed similar or slightly higher reliabilities.

Table 2 Models and fit measures (N training set = 248, N est set = 256)

	Description	dataset	χ^2	df	χ^2/df	AIC	CFI	RMSEA	90% CI	$\Delta \chi^2$ (df)	p < .001	Δ CFI
A1	16 first order factors, all r	training	2299.33	1532	1.50	-764.671	0.885	0.045	0.041, 0.049	A1 vs A2	p < .001	
A2	model A1Modified	training	1872.18	1309	1.43	-745.820	0.911	0.042	0.037, 0.046			
B2	second order factor modified	training	1961.77	1354	1.45	-746.230	0.903	0.043	0.038, 0.047			
A3	model A2 cross validated	test	1701.94	1309	1.29	-916.057	0.931	0.035	0.030, 0.039			
A4	model A2 configural	training/test	3575.26	2618	1.37	-1660.737	0.921	0.038	0.035, 0.041			A5 vs A4 < .01
A5	model A2 measurement	training/test	3611.92	2658	1.36	-1704.09	0.920	0.038	0.035, 0.041			
A6	model A2 female	female	1856.85	1309	1.42	-761.15	0.919	0.039	0.035, 0.043			
A7	model A2 male	male	1768.46	1309	1.35	-849.53	0.915	0.039	0.034, 0.044			
A8	model A2 gender configural	female/male	3624.40	2618	1.38	-1611.60	0.917	0.039	0.036, 0.042			A9 vs A8 < .01
A9	model A2 gender measurement	female/male	3677.07	2658	1.38	-11638.93	0.916	0.039	0.036, 0.042			
A10	model A2 multilevel	total	2781.31	2510	1.11	-2238.688	0.980	0.021	0.015, 0.025			

Table 3 Goal, number of items, mean, standard deviation and Cronbach's alpha for the 16 scales (N = 504)

Goal	items	M	SD	α	α^*	α^{**}	α^{***}
Belongingness (BEL)	2	4.24	0.72	.71	.89	.86	
Tranquility (TRN)	3	4.09	0.85	.79			
Social Responsibility (SOC)	4	3.88	0.78	.74			.84
Safety (SAF)	3	3.72	1.05	.82	.88		
Individuality (IND)	3	2.52	1.16	.86			
Self Determination (SDT)	4	4.34	0.68	.87	.93		
General Equity (GEQ)	5	4.16	0.66	.77			.74
Superiority (SUP)	4	2.32	1.06	.91			
Resource Provision (RPR)	4	3.99	0.84	.87		.91	
Resource Acquisition (RAQ)	3	4.00	0.75	.66			
Entertainment (ENT)	3	4.22	0.75	.72			
Mastery (MAS)	3	4.18	0.72	.73	.93	.92	.77
Positive Self Evaluation (POS)	4	4.15	0.80	.86			
Equity Parents (EQP)	3	4.52	0.79	.93			
Management (MAN)	3	4.01	0.83	.84			
Material Gain (MG)	4	3.48	1.01	.84	.79		
Pleasure/Interest (PLS)	4	2.75	1.02	.91			
Effort (EFF)	4	3.61	0.77	.70			

*comparable scales Vedder, Kouwenhoven & Burke, 2009

**comparable scales Hijzen, Boekaerts & Vedder, 2006

***comparable scales Wentzel (1993)

Table 4 *Goal, and Pearson correlation for the 16 scales (N = 504)*

Goal	BEL	TRN	SOC	SAF	IND	SDT	GEQ	SUP	RPR	RAQ	ENT	MAS	POS	EQP	MAN
Belongingness (BEL)	-														
Tranquility (TRN)	.37**	-													
Social responsibility (SOC)	.46**	.45**	-												
Safety (SAF)	.32**	.41**	.53**	-											
Individuality (IND)	.03	.08	.13**	.02	-										
Self Determination (SDT)	.21**	.39**	.24**	.20**	.10*	-									
General Equity (GEQ)	.39**	.44**	.58**	.43**	.06	.37**	-								
Superiority (SUP)	-.02	.05	-.00	-.00	.43**	.06	-.06	-							
Resource Provision (RPR)	.42**	.44**	.50**	.35**	.10*	.29**	.55**	-.06	-						
Resource Acquisition (RAQ)	.34**	.38**	.40**	.32**	.07	.33**	.46**	.01	.45**	-					
Entertainment (ENT)	.26**	.42**	.29**	.24**	.08	.47**	.37**	.00	.34**	.38**	-				
Mastery (MAS)	.29**	.44**	.42**	.37**	.07	.44**	.43**	.06	.36**	.39**	.55**	-			
Positive Self Evaluation (POS)	.32**	.53**	.34**	.32**	.08	.48**	.39**	.03	.37**	.38**	.49**	.50**	-		
Equity Parents (EQP)	.35**	.35**	.35**	.40**	-.03	.22**	.34**	-.14**	.29**	.34**	.31**	.39**	.37**	-	
Management (MAN)	.31**	.48**	.45**	.48**	.01	.32**	.54**	-.01	.44**	.38**	.35**	.55**	.49**	.46**	-
Material Gain (MG)	.07	.16**	-.03	.01	.29**	.16**	.06	.33**	.02	.08	.16**	.16**	.16**	.01	.11**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed)

Table 4 *Items, goals, standardized solution, error, and R Squared.*

	BEL	TRN	SOC	SAF	IND	SDT	GEQ	SUP	RPR	RAQ	ENT	MAS	POS	EQP	MAN	MG	E	R2
Belongingness (BEL)																		
get along with my classmates.	.973																.231	.947
be liked by my classmates.	.519																.855	.270
Tranquility (TRN)																		
feel calm		.905															.426	.819
feel secure when I give my opinion on something		.870															.492	.757
not feel irritated by classmates.		.661															.750	.437
Social responsibility (SOC)																		
show respect for classmates.			.684														.730	.468
not fight/quarrel with classmates			.615														.789	.378
get along with teachers.			.638														.770	.406
understand what teachers want			.645														.764	.416
Safety (SAF)																		
not take big risks (e.g. not drink too much or use drugs)				.714													.700	.510
avoid dangerous/risky situations				.874													.487	.763
stay out of troubles				.765													.644	.586
Individuality (IND)																		
be different from others					.902												.431	.814
be unique, special					.916												.402	.839
be able to do unusual things					.669												.743	.448
Self Determination (SDT)																		
be able to decide things myself						.708											.706	.502
be able to choose how I do my schoolwork						.949											.316	.900
be able to execute my own ideas						.598											.801	.358
be able to choose tasks and subjects for schoolwork						.883											.469	.780
General Equity (GEQ)																		
meet my appointments, do what I promised							.623										.782	.389
treat my classmates fair							.681										.733	.463
remember important things							.671										.741	.451
be able to cooperate with my classmates. .							.732										.681	.536
keep the feelings of classmates into account							.420		.385								.691	.522
Superiority (SUP)																		
know more than my classmates								.870									.493	.757
be more competent than classmates								.894									.447	.800
be more attractive than my classmates								.835									.551	.697

impress my classmates	.749	.663	.560
Resource Provisions (RPR)			
help classmates when they are not able to do a task	.741	.671	.550
help classmates when they have personal problems	.828	.560	.686
take into account if classmates need help	.807	.590	.651
cheers classmates up, when they are in trouble	.733	.681	.537
Resource Acquisition (RAQ)			
get help when I can't get done what is needed	.719	.695	.517
get help when I am having personal problems	.605	.796	.367
classmates to keep in mind what my abilities and limitations are	.546	.838	.298
Entertainment (ENT)			
be in a department that is interesting	.664	.747	.442
have variation in the lessons	.730	.684	.532
school to be pleasurable	.741	.672	.549
Mastery (MAS)			
keep on learning new things	.774	.634	.599
become a good craftsman/professional	.576	.818	.332
really understand the learning material	.803	.595	.645
Positive self-evaluation (POS)			
be satisfied with who I am.	.770	.638	.592
not to doubt myself	.811	.585	.657
know I will be good at my profession	.777	.630	.603
have the idea I am competent and capable	.760	.650	.578
Equity parents (EQP)			
not quarrel with my parents.	.910	.414	.829
get along with my parents.	.910	.416	.827
not get into trouble with my parents.	.896	.444	.802
Management (MAN)			
be tidy, orderly	.727	.686	.529
finish my work in time	.818	.576	.668
plan my work properly.	.836	.549	.698
Material gain (MG)			
have many clothes		.612	.791
make a lot of money		.773	.634
be able to buy what I want		.848	.530
have the newest things		.701	.713

3.4.3 Testing invariance

Gender invariance (A6, A7, A8, A9)

Furthermore, we tested invariance across gender. First, the best fitting model (A2) was tested on the female (A6) and male sample (A7) separately. Model A2 proved to be a reasonable model for girls (A6, $\chi^2/df= 1.41$, CFI = .919, RMSEA = .039), and boys (A7, $\chi^2/df= 1.34$, CFI = .915, RMSEA = .039). Second, we tested invariance for gender with multi-group analyses performing two increasingly stringent steps: the configural model and the measurement model. Both the configural model (A8; $\chi^2/df= 1.38$, CFI = .917, RMSEA = .039) and the measurement model showed an adequate fit (Model A9; $\chi^2/df= 1.37$, CFI = .916, RMSEA = .039, $\Delta CFI < .01$). We can conclude that the factor structure and the scores on items are fairly similar across gender.

Class invariance (A10)

Finally, we tested whether the questionnaire is invariant between classes, with a multilevel analysis, comparing model A2 across classes, allowing variance between classes. This analysis explained a small, but significant part of the variance (A10, $\chi^2/df= 1.11$, CFI = .980, RMSEA = .021), indicating that, indeed, there is some variance at class level in addition to individual variation. Inspecting the intra class correlations, providing information about the correlations within the clusters of classes, we found small but significant differences between classes for the goals Tranquility, Self Determination, General Equity, Superiority, and Resource Provision. Please not that these difference do not concern mean differences; it indicates that at class level the observed model differs from the hypothesized model, for the goals mentioned: classes tend to interpret the structure of the GIFI differently for these goals. Therefore, mean differences between classes that are found using the GIFI need to be interpreted with caution.

3.4.4 Concurrent validity

Finally, we tested whether the goals in the GIFI are related to motivational outcome measures: the effort students report they put into schoolwork and the pleasure/interest they perceive in doing schoolwork, which are, according to the Self Determination Theory basic motivational outcome measures. We performed a path analysis in EQS 6.2. A path analysis is a multivariate technique that enables us to specify relationships between exogenous variables, in this case students' multiple goals, and endogenous or dependent variables, in this case motivational engagement in the form of effort and pleasure/interest. Results show that the 16 goals explain 21% of the variance in effort, and 34% of the variance in pleasure/interest. Figure 1 and 2 show the significant relations.

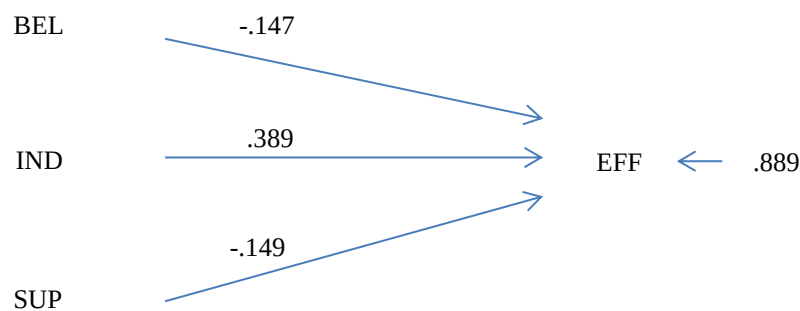


Figure 1 Path Analyses goals and effort, standardized solution, error, all factors correlated.

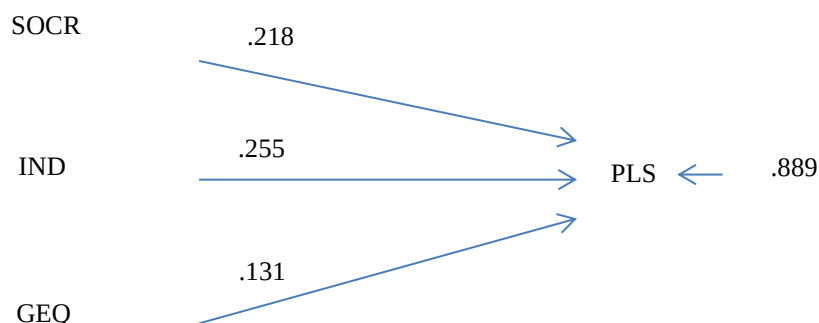


Figure 2 Path Analyses goals and pleasure/interest, standardized solution, error, all factors correlated.

3.5 Conclusion and discussion

Research to unravel what provides students with energy and direction in the classroom, has mainly focused on learning goals and – to a lesser extent – on social goals. Yet, a handful of educational and developmental psychologists have repeatedly pointed out that our thoughts, feelings and actions are influenced by multiple content goals. The aim of the present study was to validate the Goal Identification and Facilitation Inventory (GIFI), a goal questionnaire that enables researchers to study students' multiple content goals in the classroom.

We tested two models. The hypothesis, based on De Koning, Boekaerts en Zeijl, (2001), that 16 correlated factors describe the goal structure, can be accepted, albeit with some modifications. The modified model was confirmed with a cross validation. The alternative hypothesis, based on a study by Boekaerts (2009) and Smit, Boekaerts and Busing (2010), that students in vocational secondary education perceive the goals Superiority, Individuality, and Material Gain as a subgroup representing ego goals, is rejected. Although these three goals are inter-correlated and hardly correlated with the other goals, they do not share a common denominator. This strengthens the conclusion that students distinguish between 16 separate content goals.

Reported differences between boys and girls in preference e.g. for Mastery, Social Relatedness, and Autonomy goals (Anderman & Anderman, 1999; Harackiewicz, et al, 1997; Martin, 2003, 2004), urged us to test gender invariance. Analyses indicated that the 16 factor model was gender invariant; the GIFI is interpreted similarly by boys and girls. This means that differences in scores between boys and girls measured with the GIFI, can actually be ascribed to different goal preferences and not to perceiving the items of the questionnaire differently.

Furthermore, we tested whether the GIFI is invariant across classes. Multilevel analyses indicated that eleven of the 16 goals were invariant across classes and that five goals were perceived differently in various classes; Tranquility, Self Determination, General Equity, Superiority, and Resource provision. Please note that invariance indicates that classes differ in how they perceive the items; it is not the difference in the importance they attach to the goals. Differences could be explained by differences between departments. It goes without saying that student populations in the departments of Health & Welfare and Beauty Care are different from the populations in the departments Mechanics and Construction. Also, the goal structure of the classrooms, the teaching methods and grading practices used, may be at variance. We could explain how this may influence mean differences in the importance students attach to goals. It is, however, difficult to explain how different departments could lead to different perceptions or meanings of the goals. Further research is needed to determine the exact nature of the variance between classes. For now, differences between classes concerning the five goals mentioned, should be interpreted cautiously.

Finally, we tested the concurrent validity of the 16 goals for basic measurements of motivation. We conclude that, although goals explain a moderate part of the variance, only a limited number of goals are significantly related to effort and pleasure/interest. This is in contrast previous studies that showed that social goals are related to effort and academic achievement (Wentzel, 1989, 1991, 1996, 2000), peer acceptance (Wentzel, 1994) and the quality of collaborative learning (Hijzen, Boekaerts & Vedder, 2006).

Limitations

The validation shows that the GIFI is a useful research instrument to measure multiple goals. However, several limitations and considerations have to be taken into account. First, the generalizability of the study is limited, as it was executed in a specific group of students.

This study suggests that the GIFI is suitable for students in pre-vocational secondary education. Cross validation with different student populations should inform us whether the GIFI can be deployed for other student populations. Second, the less concrete goals like Unity, Transcendence, and Creativity were left out of the GIFI in a previous study; according to the students in that particular study, these goals either did not make sense or did not relate to their own reality. Still, even though Ford and Nichols (1987) acknowledged that the higher order goals “are difficult to define in precise terms” (p. 299), future research could reformulate the contested goals in wordings and style that might address adolescents in different types of school, to enable us to study the taxonomy as a whole. Another consideration concerns the type of questions that need to be asked to grasp the different aspects of goals. The GIFI asks about goal importance (Identification) and whether the context facilitates the pursuit of the goals (Facilitation). However, these are only two ways of studying students’ goals of which we only studied goal importance. According to Wentzel (1999), a person might deem many outcomes important, but not act accordingly. Her way of asking is ‘how often do you try to reach this goal’. The Achievement Goal Theory questionnaire (Elliot & Murayama, 2008) and the social goal orientations questionnaire (Dowson & McInerney, 2003;2004) ask about goal content, followed by the why of a goal; the goal to please ones parents, for example, can underlie the mastery goal. Mansfield (2009) studied the same relation, but, instead of formulating two goals in one item, she first asks about goal content, followed by the ‘why’ of that specific goal. Wentzel and Wigfield (1998) and Little, Salmela-Aro, and Phillips (2007) used yet another approach in their Personal Project Analysis. They take into account various perspectives on goals, e.g. the support from the environment, influence from peers, costs and benefits, thus gathering rich information about a person’s goals. However, this brings about other obstacles, for example, the amount of questions a respondent can digest, and the instruments researchers can use; paper and

pencil questionnaires are known to be difficult for obtaining answers to all the questions (e.g. Bowing, 2005). Another consideration concerns the overlap of various existing goal questionnaires. A quick, comparative glance at the GIFI, and e.g. the goal questionnaire developed by Wentzel (1993), the GOAL-S (McInerney & Dowson, 2004), the coding system for the Motivation Induction method (Nuttin, 1985), the Achievement Goal Theory questionnaire, the Importance of Goals Scale (Carroll, Durkin, Hattie & Houghton, 1997) and the IMI, used for research based on the Self Determination Theory, reveals overlap as well as unique contributions. Cross validating the different questionnaires could sort out the overlap, providing a more comprehensive instrument for future research.

In conclusion, the GIFI is a valid and stable instrument, allowing us to study goal salience. However, given the complexity of measuring goals, further study is necessary to get a firm grip on multiple content goals in relation to other aspects of motivation and self-regulation.