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## Does excellence matter? The influence of potential for excellence on students' motivation for specific collaborative tasks

Annedien G. Pullen<sup>a\*</sup>, Didi M. E. Griffioen<sup>b\*</sup>, Judith Schoonenboom<sup>c</sup>, Björn B. de Koning<sup>d</sup> and Jos J. Beishuizen<sup>a</sup>

<sup>a</sup>Department of Educational and Family Studies, Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam, Amsterdam, Netherlands; <sup>b</sup>Staff Department Education & Research (O&O), Amsterdam University of Applied Sciences, Amsterdam, Netherlands; <sup>c</sup>Department of Education, University of Vienna, Vienna, Austria; <sup>d</sup>Department of Psychology, Education, and Child Studies, Erasmus School of Behavioral and Social Sciences, Erasmus University Rotterdam, Rotterdam, Netherlands

### ABSTRACT

It is often assumed that students with a higher potential for excellence are less motivated to collaborate. So far, the question remains whether this is actually the case. This survey study investigated the influence of business students' ( $N=389$ ) potential for excellence on their motivation to collaborate on a business-related task. Different aspects of potential for excellence were taken into account, including intelligence, creativity, first-year grade point average (GPA), and personality. A structural equation modeling analysis was applied. The findings demonstrated that only GPA had a negative influence on students' collaborative values, indicating that the assumption that students with a higher potential for excellence are less motivated to collaborate receives limited support. In addition, the findings showed that different aspects of potential for excellence were related to different aspects of motivation to collaborate. This indicates that the relationship between potential for excellence and motivation is more complex than often considered.

### KEYWORDS

Potential for excellence; motivation; self-efficacy; collaborative learning; personality

## Introduction

Nowadays, collaborative skills have become an important graduate attribute for future highly educated professionals (Binkley et al. 2012; Edmondson 2012). In Western knowledge economy, progress and welfare are to a large extent connected to innovations using complex methods and technologies, and thus to the ability to find creative solutions for new problems (Peters, Marginson, and Murphy 2009). Hence, close collaboration between professionals is needed to integrate different ideas and knowledge for the development of complex innovations. To make these innovations possible, companies seek the best professionals who combine specialized knowledge with the skills to collaborate. It is therefore important that the higher education system not only focuses on teaching content knowledge, but also strives to educate 'excellent collaborators' and promote 'excellent collaboration' to prepare students for the labor market.

**CONTACT** Annedien G. Pullen  a.g.pullen@vu.nl, annedien.pullen@gmail.com  Faculty of Behavioural and Movement Sciences, Department of Educational and Family Studies, Vrije Universiteit Amsterdam, Van der Boechorstraat 1, 1081 BT Amsterdam, Netherlands

\*These two authors contributed equally and are both considered as first authors.

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Despite the need for high-level professionals with collaborative skills, it is often assumed that students with a high potential for excellence are not motivated to collaborate with other students (French, Walker, and Shore 2011). This provides a possible problem because if high-potential students lack motivation for collaboration, it is possible that they will not become the best collaborative professionals for which the labor market is searching. Context-related aspects such as motivation might play an important role in the transfer of 'potential for excellence' to 'actual excellent performance' within a specific context (Renzulli 1986). However, so far research on the relationship between students' potential for excellence and motivation for collaboration in higher education is scarce. Hence, the aim of the current study is to investigate the influence of students' potential for excellence on their motivation to collaborate on an upcoming task.

In this respect, two aspects are important to consider. First, to gain a better understanding of students' motivation, we approach motivation from a situational perspective. Previous research has mainly focused on students' general motivation for collaboration without considering the actual context in which students collaborated (Shaw, Duffy, and Stark 2000; Su 2007). However, students' motivation likely changes from setting to setting (Wolters and Pintrich 1998). So, to gain a better understanding of students' actual motivation, the context of the collaborative task must be taken into account. In the case of collaboration, it is thus important to consider both students' motivation for working in a collaborative setting and students' motivation for the specific collaborative task (Walker, Shore, and French 2011).

Second, in previous research, students' potential for excellence is often investigated by comparing honors students with regular students using self-perception instruments (Scager et al. 2012). In the Netherlands, honors programs are mostly extracurricular, selective activities in addition to the regular program and require an extra time investment of students. Although, comparing honors students and regular students provides insight into the characteristics of honors students, one might expect that honors students would score higher on self-perception instruments because they are already presumed and labeled excellent by taking part in an honors program. Hence, objective instruments are needed to measure students' potential for excellence.

This study provides insight into how student characteristics and student motivation for collaborative tasks interrelate, and therefore provide a first explanation of why students are (not) motivated to collaborate, which likely influences students' behavior and achievement (Wigfield and Eccles 2000). So far, little is known about this interrelation in actual higher education settings when students collaborate. Previous research mainly focused on motivation for collaborative settings in general. These findings show that higher motivation for collaborative settings result in higher satisfaction and performance of a group (Shaw, Duffy, and Stark 2000). Additionally, higher levels of self-efficacy for collaborative settings lead to a higher perceived collectivism within a group which results in a better performance (Eby and Dobbins 1997). By making a distinction between motivation for the task at hand and motivation for collaborative settings, the current study strives to gain more detailed insights into students' motivation to work on a collaborative task. Knowing what students drive to work on collaborative projects and how that is related to their characteristics of potential for excellence will make it easier for lecturers to motivate students with different characteristics.

Based on the results, guidelines for educational practice will be derived about how to take motivation of students with different characteristics of potential for excellence into account in designing collaborative tasks. This will provide the base for future studies on student–teacher interaction during collaborative tasks.

## Theoretical overview

In line with Subotnik, Olszewski-Kubilius, and Worrell (2011), the current study considers excellence not just as a student's ability, but as a manifestation of behavior that a student shows in a specific context. So, a certain amount of cognitive ability is needed to manifest excellent performance, but it is not sufficient to reach actual excellent performance (Sternberg and Davidson 2005). This

situational approach emphasizes the importance of the learning environment when excellence is considered (Barab and Plucker 2002). Hence, personal factors can only provide an indication of a student's *potential* to show excellent performance, and they are not an indication of *actual* excellent performance.

A well-known model to study students' potential for excellence is the three-ring conception of giftedness of Renzulli (1986), which forms the basis for this study. According to this model, three traits are necessary to have the potential to become an excellent innovative professional: (a) above-average ability within a certain domain, (b) creativity, and (c) task commitment. Of this model, the first two aspects can be considered as cognitive aspects of potential for excellence, where the third aspect is a more motivational trait.

### ***Students' potential for excellence***

The first ring of Renzulli's (1986) model is ability. Two commonly used aspects to determine ability are intelligence (Fagan, Holland, and Wheeler 2007) and grade point average (GPA) (Kuncel et al. 2010). Previous research has demonstrated that intelligence only has limited predicting value in understanding the academic success of individually working higher education students (Busato et al. 2000; De Koning et al. 2012; Kappe and Van der Flier 2012). Intelligence appears to play a more significant role in collaborative settings, for example in helping to make effective decisions within a group (Devine and Philips 2001). Students' GPA provides an indication of a student's already realized potential within a certain content domain in education and is often used as a measure of academic achievement (De Koning et al. 2012; Kappe and Van der Flier 2012).

Based on the second ring of Renzulli's model (1986), students' creative potential is included in this study. Creativity has become increasingly important for success in the workplace in the Western knowledge economy, due to the ill-structured and open-ended challenges business face (Binkley et al. 2012; Peters, Marginson, and Murphy 2009). In educational settings, creativity also plays a role in more ill-structured tasks such as dissertations and group projects (Chamorro-Premuzic 2006). Moreover, highly creative students prefer assessments that involve interaction with other students (Chamorro-Premuzic 2006). Based on these findings, we expect creativity to be important for collaborating on a task because collaborative tasks are often more ill-structured and require interaction with other students.

Intelligence, GPA, and creativity mainly reflect students' cognitive potential for excellence. When considering potential for excellence in a collaborative context, non-cognitive factors like personality might be relevant because social and constructive complexity becomes more important when students collaborate on a task. The Big Five model of personality distinguished five personality traits: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Costa and McCrae 1992). Of the personality traits is conscientiousness a particularly good predictor of academic achievement (Busato et al. 2000; De Koning et al. 2012; Kappe and Van der Flier 2012; Poropat 2009). Agreeableness and openness to experience are also positively related to academic achievement (Poropat 2009). In collaborative settings, extraversion is positively related to students' GPA for collaborative courses (Kappe and Van der Flier 2012) and a preference for assessments that involve group work (Chamorro-Premuzic et al. 2005), suggesting that especially highly extravert students can be presumed to perform well within collaborative settings.

Thus, in order to provide a broad image of students' potential for excellence, the current study takes four aspects of potential for excellence into account: (1) intelligence, (2) first-year GPA, (3) creativity, and (4) personality.

### ***Students' motivation***

The last ring of Renzulli's model (1986) is a motivational trait. Motivation is important for successful student collaboration, because it positively influences the interaction within a team of students (Rienties

et al. 2009). In the current study, motivation is considered as a feature that is influenced by the educational setting in which students act (Wolters and Pintrich 1998). According to the expectancy-value theory, a student's motivation to participate in a certain activity depends on two factors: (a) the *value* that a student assigns to that activity and (b) the *expectations* of a student about his or her own ability to accomplish that activity (Wigfield and Eccles 2000). Bandura (1997) refers to a person's expectations as self-efficacy. Self-efficacy beliefs influence the goals that students set, the amount of effort they put in a certain activity, and their persistence toward task completion (Bandura 1997; Pintrich and Schunk 2002).

Furthermore, when students' motivation for collaboration is considered, it is important to take both their motivation for the specific task and the motivation for the specific collaborative settings into account (Walker, Shore, and French 2011). This means that when motivation is applied to collaborative learning situations, it becomes a complex construct, since it can be divided into aspects of task-related motivation as well as aspects of collaborative motivation (Johnson, Johnson, and Holubec 1994), resulting in four related constructs: (1) task-related values, (2) task-related self-efficacy, (3) collaborative values, and (4) self-efficacy for collaborative settings. In collaborative settings, this distinction is important because a student could be motivated to work on the content of a task, but this does not necessarily imply that the student is motivated to collaborate on that task. Conversely, a student could be motivated to work in a collaborative setting, but does not value the content of the task.

However, research on students' potential for excellence in relation to their motivation to collaborate is relatively limited. Previous research studied the relationship between students' GPA and motivation to collaborate and showed that students with high GPAs prefer to work alone compared with students with lower GPAs (Opdecam et al. 2013; Shaw, Duffy, and Stark 2000). These findings seem to support the assumption that students with a higher potential for excellence prefer to work alone. However, these studies focused on students' GPA, which is only one aspect of potential for excellence. Additionally, most of these studies focused on students' preferences for collaborative learning in general, without taking a specific collaborative context into account. Hence, the current study aims to investigate whether this assumption is actually the case by regarding varying aspects of potential for excellence as well as regarding students' collaborative motivation from a situational perspective.

The current study answers the following research question: What is the influence of students' potential for excellence (intelligence, creativity, first-year GPA, and personality) on their motivation to collaborate on a task (task-related values, task-related self-efficacy, collaborative values, and self-efficacy for collaborative settings)? This relationship will be examined using a structural equation modeling (SEM) analysis with the aspects of potential for excellence as predictor variables and the aspects of motivation for specific collaborative tasks as outcome variables.

## Methods

### Sample

Undergraduate students of two Business programs of a Dutch University of Applied Sciences participated in a survey study ( $N = 389$ ). In the Netherlands, honors programs provide mostly extracurricular activities in addition to the regular program which means that honors student also participate in the regular program. Hence, students from regular programs participated in this study in order to include students with varying levels of potential for excellence. The students were enrolled in a Sports, Management, and Business program (third-year students;  $N = 129$ ) and in a Marketing and Commerce program (first- and second-year students;  $N = 260$ ) (for all participant characteristics, see Table 1). Eight students were excluded because of missing data. All students participated voluntarily, gave informed consent to participate in the study, and approved the retrieval of personal data from the student administration system.

**Table 1.** Characteristics of the students of the two Business programs.

	Sport Management and Business students	Marketing and Commerce students
<i>N</i>	129	260
Age	20.7 (SD = 1.6)	20.6 (SD = 1.9)
Gender	59% male	58% male
Prior education		
Intermediate vocational education	28.1%	29.6%
Higher general secondary education	45.3%	43.5%
Pre-university education	25.8%	8.5%
Other	0.8%	1.2%
Unknown		16.9%

### **Collaborative task**

All students collaborated in teams on a business-related task that was part of their study program. The Sports, Management, and Business students collaborated in teams of 2 or 3 students during 1 semester (20 weeks). The collaborative task was to invent a marketable product or service that was related to the sports business and not available on the market yet. At the end of the semester, they had to hand in a collectively written business plan. The interdependence between students was high since they received a collective grade for the course. The Marketing and Commerce students collaborated in teams of 4–5 students for half of a semester (10 weeks). The first-year students had to develop a product and wrote a collective marketing-communication strategy for that product. The second-year students had to write a collective marketing-communication strategy for a cultural foundation. The interdependence between these students was somewhat lower than between the Sports, Management, and Business students (but still high), because the grade that was awarded to the collective marketing-communication strategy comprised 60% of the students' final grade for the course.

### **Measures**

Four indicators of students' potential for excellence and four scales for motivation were used in the current study. For all measurements, see [Table 2](#).

### **Intelligence**

Intelligence was measured using three subtests of the Multicultural Capacity Test for Higher Education (Bleichrodt and Van den Berg 2006). A verbal reasoning test (word analogies), a numerical test (numeracy skills), and a spatial test (exclusion) were applied. The total number of correct items of each test were converted to standardized scores based on a normative group of undergraduate students ranging from 1 (very low) to 9 (very high). Collectively, the norm scores of the three subtests were modeled as the latent factor Intelligence.

### **Creativity**

Creativity was assessed using the Alternative Uses Test (AUT) (Guilford 1967), which is a divergent thinking test to measure students' creative thinking. The AUT is often used to assess creative thinking and provides an indication of a person's potential to manifest creative performance (Runco and Acar 2012). Divergent thinking tests are a valid and reliable measure of students' creative potential and are often applied in higher education (e.g. Chamorro-Premuzic 2006; Sánchez-Ruiz et al. 2011). In this test, students had to write down as many ways to use three common objects as possible: a brick, a paperclip, and a shoe. For each object, students had three minutes to write down their responses. The number of responses for each of the three objects was modeled as the latent factor Creativity.

**Table 2.** Means, standard deviations, and factor loadings of all items and scales.

	<i>N</i> items	Cronbach's alpha	Mean (SD)	Factor loadings (CFA)	Sample items
Intelligence		.59			
Verbal reasoning skills			3.6 (1.6)	.54	
Numeracy skills			4.8 (1.9)	.70	
Spatial skills			5.2 (2.1)	.47	
Creativity		.86			
Test 'Brick'			10.3 (4.1)	.84	
Test 'Paperclip'			9.9 (4.1)	.87	
Test 'Shoe'			12.9 (5.9)	.80	
First-year GPA			6.84 (.43)		
Personality					
Neuroticism		.78	4.4 (1.6)		
Extraversion		.76	5.6 (1.7)		
Openness to experience		.63	4.9 (1.8)		
Agreeableness		.69	4.3 (1.7)		
Conscientiousness		.80	4.8 (1.8)		
Motivation					
Intrinsic task-related values	6	.81	3.7 (.64)		I will enjoy working on this task.
Extrinsic task-related values	3	.71	3.8 (.71)		During this task, I find it important that my group is considered one of the best groups.
Task-related self-efficacy	6	.73	3.9 (.45)		I expect that I'm well able to accomplish a task of this degree of difficulty.
Collaborative values	3	.77	3.5 (.75)		I prefer to work on a team rather than individual tasks.
Collaborative self-efficacy	8	.75	3.9 (.43)		In general I am well able to work together in a team.

### *First-year GPA*

For each student, GPA was calculated based on all the grades that students received on first-year courses. In calculating the GPA, the load assigned to each grade was taken into account.

### *Big Five personality*

Personality was measured using the NEO Five Factor Inventory which consists of 60 items (12 items per trait) and assesses the Big Five personality traits neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (Costa and McCrae 1992). Responses to items were given on a 5-point Likert-type scale ranging from 1 (do not agree at all) to 5 (fully agree). Per trait, the scores on the items were added and converted to standardized scores between 1 (very low) and 9 (very high) based on a normative group with comparable age.

### *Task-related values*

This scale was newly developed and inspired by the value components of the Motivated Strategies for Learning Questionnaire developed by Pintrich et al. (1991), which distinguishes intrinsic values, extrinsic values, and task values. However, the scale developed for the purpose of the current study focused on students' motivation to work on the content of a particular task rather than motivation for a particular course. This scale was composed of nine items; three items for each of the three value components.

### *Task-related self-efficacy*

Task-related self-efficacy was assessed with a 6-item scale that focused on students' self-efficacy to work on a task. The items were developed for the purposes of this study using Bandura's (2006) guidelines to construct self-efficacy scales. The constructed scale focused on students' beliefs in their own ability to work on a specific task.

### ***Collaborative values***

Collaborative values were measured by means of the preferences for group work scale developed by Shaw, Duffy, and Stark (2000). The original scale consisted of seven items. In the current study, two items were removed, because they did not address values regarding working in a group.

### ***Collaborative self-efficacy***

Collaborative self-efficacy was measured using the 8-item self-efficacy for teamwork scale developed by Eby and Dobbins (1997) which measured students' beliefs in their ability to work effectively within a team. The scale was slightly adapted by rephrasing negatively phrased items into positively phrased items in order to make the items easier to understand. For all four motivational scales, items were answered on a 5-point Likert-type scale ranging from 1 (do not agree at all) to 5 (fully agree). The four scales were each modeled as a latent factor with the items of that scale as observed variables.

### ***Data analysis***

First, the descriptives for the aspects of potential for excellence (intelligence, creativity, first-year GPA, personality) and the four scales measuring students' motivation for specific collaborative tasks (task-related values, task-related self-efficacy, collaborative values, and collaborative self-efficacy) were analyzed in SPSS21. Second, an exploratory factor analysis was conducted in SPSS21 in order to examine the dimensionality of the four motivation scales, since most motivational scales were adapted or newly developed. Third, to answer the research question, SEM analysis was conducted using MPlus7 (Muthén and Muthén 2012). The first step was to test all latent factors as part of the measurement model by means of a confirmatory factor analysis (CFA) to assess the adequacy of the model fit. After establishing an acceptable model fit, the structural model was added in the second step. Since this is the first study that takes different indicators of potential for excellence into account in order to examine the influence of potential for excellence on students' motivation, we chose to explore the relationships in the structural model by means of a model-trimming procedure. In this procedure, relationships were one by one removed based on the least significant effect. Maximum likelihood estimations were used to estimate the models' parameters. The model fit was evaluated by the chi-square statistics and the root mean square error of approximation (RMSEA). A  $\chi^2/df < 3$  (chi-square divided by the degrees of freedom) indicates a good model fit. An RMSEA value lower than .08 indicates an acceptable model fit, whereas values lower than .05 indicate a close fit (Kline 2005). The difference in chi-square ( $\Delta\chi^2$ ) was used to evaluate the goodness of fit between the measurement model and the final structural model. A significant  $\Delta\chi^2$  indicates that the two models significantly differ from each other (Kline 2005).

## **Results**

### ***Descriptives***

The descriptives for the aspects of potential for excellence and motivation are presented in Table 2. When considering intelligence, on average the students perform reasonably low on the verbal reasoning test. Average scores were obtained on the numerical and spatial tests. Students' scores on creativity ranged from 10 to 13 for the three objects. The standard deviations show that there is a reasonably high variation in the number of responses, indicating that students differ in the ability to generate ideas of how to use common objects. The descriptives of motivation for specific collaborative tasks show that students' task-related values are higher than students' collaborative values. The self-efficacy to work on the task and to work in a collaborative setting are both reasonably high, indicating that students on average feel confident about their ability to perform a specific task in a collaborative setting.



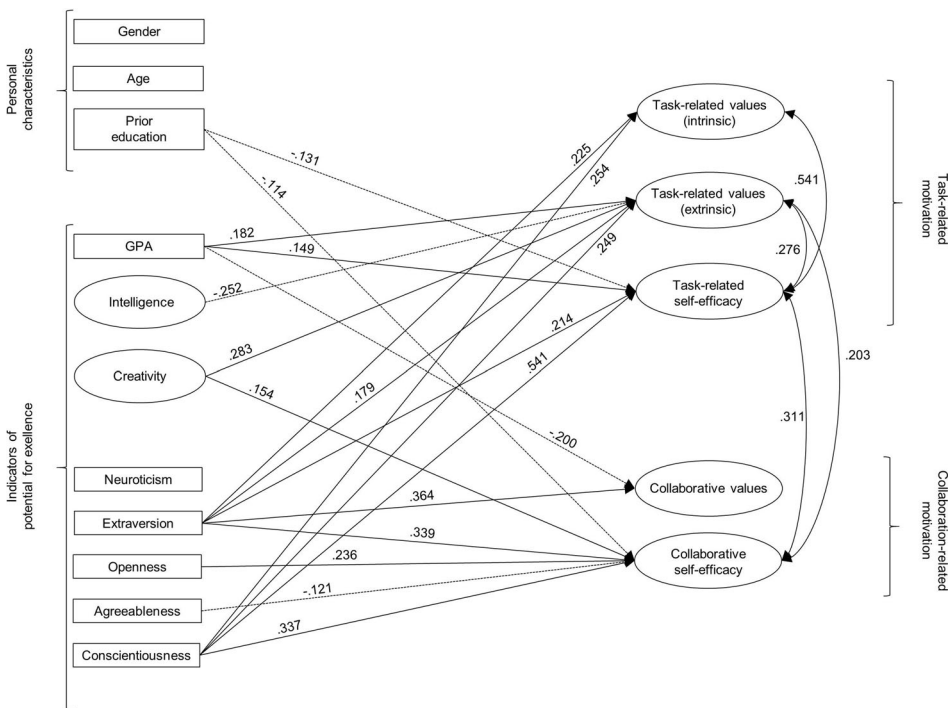
### Scales

An exploratory factor analysis (eigenvalues and scree plot) showed that the task-related values scale loaded onto two factors: an intrinsic task-related values scale and an extrinsic task-related values scale. Two negatively phrased items of the collaborative values scale load on a different factor than the other three items. These two items were removed, resulting in a scale of three items. Hence, the factor analysis resulted in five different scales measuring students' motivation for collaborative tasks. The findings of the exploratory factor analysis were used as a starting point for the CFA.

Cronbach's alphas of the five motivation scales range from .71 to .81, indicating that internal consistency of the scales is 'acceptable' to 'good' (Kline 2005). Although Cronbach's alpha of the three tests measuring intelligence was relatively low, together the three tests did result in a latent factor with acceptable factor loadings. Cronbach's alpha of the creativity scale was high based on the three objects. Cronbach's alphas of the Big Five personality traits range from .63 to .80 in this study, indicating a 'moderate' to 'good' internal consistency.

### Model fit

The indicators of potential for excellence and the five motivation scales were placed in a measurement model. In addition, the personal characteristics of age, gender, and prior education were added to the model as control variables. The measurement model showed an acceptable model fit:  $\chi^2(668) = 1319.63$ ,  $\chi^2/df = 1.98$ ,  $p < .001$ , RMSEA = .051. All observed variables loaded significantly on the latent factors. After the structural model was added, 36 relationships were removed from the model during the model-trimming procedure. See Figure 1 for the final structural model. The fit of the final structural model with the observed data was acceptable:  $\chi^2(704) = 1361.62$ ,  $p < .001$ ,



**Figure 1.** The effect of potential for excellence on motivation for specific collaborative tasks (final model). Only standardized results of significant relationships are presented in the figure (negative relationships are presented with a dotted line).

$\chi^2/df = 1.93$ , RMSEA = .050. The fit of the final structural model did not significantly differ from the measurement model:  $\Delta\chi^2(36) = 41.99$ ,  $p = .227$ .

## Structural model

### Personal characteristics

Table 3 provides a summary of the main findings of the final model. Of the personal characteristics (gender, age, prior education), only prior education influences students' motivation to collaborate. Prior education has a negative influence on both task-related self-efficacy and collaborative self-efficacy, indicating that students with a higher level of prior education feel less able to work on a task and in a collaborative setting.

### Aspects of potential for excellence

Intelligence, creativity, and GPA have direct (small to medium) effects on students' motivation to collaborate. Students who score higher on intelligence score lower on extrinsic task-related values, whereas students with a higher level of creativity and students with higher GPAs score higher on extrinsic task-related values. In addition, students with higher creativity have higher self-efficacy for collaborative settings. Students with higher GPAs have higher self-efficacy to fulfill the task and lower collaborative values. Of the personality traits, extraversion and conscientiousness specifically have a strong positive influence on students' motivation to collaborate. Higher levels of extraversion have a positive influence on all five aspects of motivation. Higher levels of conscientiousness have a positive influence on all aspects of motivation except for collaborative values. In addition, agreeableness negatively influences self-efficacy for collaborative settings, indicating that students who score higher on agreeableness feel less able to work in a collaborative setting. On the contrary, openness to experience has a positive influence on collaborative self-efficacy.

### Covariates

The findings show that there is a high positive covariance between intelligence and creativity (.48) and between intelligence and GPA (.29). In addition, there is a covariance between intelligence and the personal characteristics of gender (−.17) and prior education (.49). GPA shows small to medium significant covariates with all personal characteristics. There are no significant covariates between the three cognitive indicators of potential for excellence and the personality traits, indicating that the cognitive indicators and the non-cognitive indicators of potential for excellence are not related to each other. However, there are small to medium significant covariates between the five personality traits, indicating that students balance all five traits in their personality. In addition,

**Table 3.** Summary of the main findings.

GPA	(+) Extrinsic task-related values (+) Task-related self-efficacy (−) Collaborative values
Intelligence	(−) Extrinsic task-related values
Creativity	(+) Extrinsic task-related values (+) Collaborative self-efficacy
Extraversion	(+) Intrinsic task-related values (+) Extrinsic task-related values (+) Task-related self-efficacy (+) Collaborative values (+) Collaborative self-efficacy
Openness	(+) Collaborative self-efficacy
Agreeableness	(−) Collaborative self-efficacy
Conscientiousness	(+) Intrinsic task-related values (+) Extrinsic task-related values (+) Task-related self-efficacy (+) Collaborative self-efficacy

there are significant covariates between some personality traits and personal characteristics. An overview of all covariates can be requested at the authors.

## Discussion

To test the assumption that students with a higher potential for excellence are less motivated to collaborate, the current study investigated the influence of students' potential for excellence on their motivation for specific collaborative tasks. The findings demonstrate that this assumption receives limited support. Of the aspects of potential for excellence, only GPA has a negative influence on students' collaborative values. In addition, the findings show that different aspects of potential for excellence are related to different aspects of motivation for specific collaborative tasks. Hence, it can be concluded that the relationship between potential for excellence and motivation for specific collaborative tasks is more complex than often considered. The main findings and practical implications will be discussed below.

All cognitive aspects of potential for excellence (intelligence, creativity, and GPA) influence students' extrinsic values regarding the task, but they do so in different ways. Students with higher levels of creativity and students with higher GPAs find their motivation for the task in receiving high grades, whereas this appears less important for students with higher levels of intelligence. Where the cognitive aspects of potential for excellence are only related to extrinsic task-related values, the personality traits extraversion and conscientiousness are also related to intrinsic task-related values. Previous research has shown that academic intrinsic motivation positively influences the quantity and quality of individual contributions during collaboration in a computer-supported setting (Rienties et al. 2009). Combined with the results, this implies that extraversion and conscientiousness might be favorable characteristics in collaborative settings. Moreover, with a positive effect of extraversion and conscientiousness on task-related self-efficacy and collaborative self-efficacy, students with these characteristics also feel more confident about their own capabilities. Groups composed of members with high self-efficacy feel more capable to work on collaborative projects and perform better (Wang and Lin 2007). Based on these results, it seems that deliberately dividing extravert and conscientious students among the groups, with the objective to have intrinsically motivated students with a high self-efficacy in each group, could be a starting point for composing groups in collaborative settings. However, lectures should also be very attentive to possible frustration of the extravert and conscientious students when the other group members are not willing or able to share their intrinsic and confident enthusiasm (Lizzio and Wilson 2005).

These findings also suggest that more attention to personality as a non-cognitive aspect of potential for excellence can provide an additional explanation of struggles related to equity and distribution of workload that are often reported by teams of collaborating students (Lizzio and Wilson 2005). Considering intelligence, creativity, and GPA, in this study the struggles are likely related to differences in the level of extrinsic motivation of the students. And however it then seems plausible to adjust group composition accordingly, previous research has also shown how differences in potential for excellence are needed, since intelligence is related to effective decision making (Devine and Philips 2001), creativity is related to generating novel ideas (Runco and Acar 2012), and students with high GPAs can help the group to stay focused on the end goals of the project (Su 2007). And while it is in the lectures interest to keep students motivated, it is also in their interest to help them to finish their collaborative projects.

Another important finding is that students with higher GPAs report lower values regarding collaboration. When considered in more detail, the reason of the lower collaborative values of students with high GPAs could be explained by their higher scores on extrinsic task-related values and task-related self-efficacy. It seems that they do not want to be dependent on the contributions of other group members for their own result. This finding is in line with previous research demonstrating that students with higher GPAs prefer to work alone (Opdecam et al. 2013; Shaw, Duffy, and Stark 2000). Of the other aspects of potential for excellence, only extraversion influences collaborative

values. So, when a broader approach to potential for excellence is considered, the assumption that high-potential students lack motivation for collaboration receives limited support. This indicates that the expected problem that students with high potential for excellence will not become the best collaborative professionals, due to lack of motivation, is not really the case. This is reassuring because the labor market attaches great importance to talented professionals with good collaborative skills (Binkley et al. 2012; Shaw, Duffy, and Stark 2000).

It is not easy to overcome struggles caused by motivation, especially when motivation in collaborative settings can have at least four different directions. However, similar motivational differences also exist in professional practice. Hence, the best way to deal seems to be to teach students how to overcome these differences. One way to do so is to teach students to face these differences at the start of the project, and recognize signals of motivational differences during the project. By explicitly and openly stating what each student wants to achieve with the project, as well as to what each member believes they are able to contribute, differences are made clear and common goals can be set based on the individuals' goals and talents. Additionally, the lecturer needs to facilitate and support students to create a good climate in which students feel safe to express their ideas and unique talents and reflect upon the group process (Chapman and Van Auken 2001; Gueldenzoph-Snyder 2009). This also means the lecturer needs to stay away from being (implicitly) judgmental on non-intrinsic learning goals.

Secondly, knowing the reasons of why some students prefer to work alone (e.g. students with higher GPAs) gives lecturers the opportunity to take this into account in designing collaborative projects. It is important that lectures not only explain the content of the task, but that they also emphasize the added value of working on group projects for their future professional career to students. In addition, lectures can use varying assessment methods of group work to enhance motivation. Including the group process in the assessment by taking individual contributions to that process into account by using logbooks and/or peer evaluations (Kamp et al. 2011) leads to more positive experiences of group work (Chapman and Van Auken 2001). This is in line with the call of Lizzio and Wilson (2005) to pay more attention to teaching students collaborative skills and not only to focus on the group outcome.

## Limitations and further research

This study focused on the relationship between students' potential for excellence and their motivation for specific upcoming collaborative tasks. The following aspects need to be considered in interpreting the findings. First, this study did not take composition of the groups into account. It is likely that group composition has influenced students' actual motivation to collaborate. Second, this study is restricted to students enrolled in business-related programs. Therefore, research in other disciplines is needed to reach more general conclusions on the relationship between students' potential for excellence and their motivation for specific collaborative tasks. Third, the measurements of the aspects of potential for excellence were chosen based on the possibility to apply these measures to a large sample. This means that a divergent thinking task was chosen to assess students' creative potential which is the most used test to measure creativity (Runco and Acar 2012). However, in future research, it would be important to complement the divergent thinking task with creative personality tests and tests focusing on creative achievement in daily life to measure more complex creative skills (Runco and Acar 2012). Fourth, in line with previous research (e.g. Busato et al. 2000; Kappe and Van der Flier 2012), intelligence was treated as a single construct that was modeled as a latent variable based on three tests (i.e. verbal reasoning test, numerical test, spatial test). The internal consistency of this general intelligence measure was relatively low, which might be not surprising given that the three tests assess different aspects of intelligence. It is thus important to interpret the results regarding intelligence with some caution. Future research is required to investigate whether similar results are obtained with an intelligence measure having higher internal consistency or when separate constructs of intelligence rather than a single latent factor are used.

To summarize, the current study provides insights into how students' potential for excellence influences their motivation for an upcoming collaborative task. The findings of this study contribute to our knowledge on motivation for collaboration by showing that students with different characteristics of potential for excellence are differently motivated for a collaborative task. Taking the motivation of students with different aspects of potential for excellence into account could lead to fewer struggles between group members and a higher student engagement. Hence, the findings show the importance of taking students' motivation into account in designing collaborative projects.

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