A head start in higher education: the effect of a transition intervention on interaction, sense of belonging, and academic performance

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ABSTRACT

Given the challenging transition from secondary school into higher education, this quasi-experimental study measured the effects of a pre-academic programme (i.e. before starting at university) on student–faculty interactions, student–peer interactions, sense of belonging, and first-year academic performance. Fifty-eight first-year students participated in a pre-academic programme (i.e. the experimental group) focused on changing their perceptions of effective learning behaviour to enhance high-quality interaction with peers and faculty, their sense of belonging, and academic performance. A control group comprised 237 first-year students who did not attend the programme. Participation in the programme enhanced formal student–faculty and student-peer interactions, as well as informal student-peer interactions. No effect was found on sense of belonging. Furthermore, participation in the programme enhanced students' attained grade during the first course and enhanced their first-year cumulative GPA. The results suggest that participation in the pre-academic programme could give students a head start in higher education.

Introduction

For many students, the transition to higher education (HE) is a difficult hurdle (Gale and Parker 2014; Harvey, Drew, and Smith 2006). They must learn how to deal with the new learning environment, build new relationships with peers and faculty, and grow into their new role as HE students (Wilson et al. 2014). Retention rates show that about 20 percent of students studying full time at higher education institutions (HEIs) in the United States and Australia fail to make the transition successfully; i.e. they do not continue into the second year (Australian Government 2015; National Center for Education Statistics 2015). In the United Kingdom, non-continuation rates from the first to the second year vary between 1.2 and 21.4 percent among HEIs (Higher Education Funding Council for England 2016). In other European countries, such as the Netherlands, policymakers are also not satisfied with the number of students completing the first year (Inspectie van het Onderwijs

[Dutch Inspectorate of Education] 2017). The transition into HE thus seems problematic for many students (Pascarella and Terenzini 2005).

HEIs help students connect to peers and faculty, to feel at home in HE, and to perform well by setting up transition programmes (Hatch and Bohlig 2016), such as summer bridge programmes (e.g. Cabrera, Miner, and Milem 2013; Sablan 2014), first-year seminars (e.g. Inkelas et al. 2007; Porter and Swing 2006), and learning communities (e.g. Keup 2005). Evaluations of transition programmes have shown that participating students felt adequately prepared to interact with peers about school-related subjects and personal matters (Ackermann 1991), and that they took part in campus activities more often and had more informal contact with faculty over time (Walpole et al. 2008). Other studies have shown that transition programmes enhance a sense of belonging in HE (e.g. Walton and Cohen 2011), contribute positively to the intention to persist in it (Porter and Swing 2006), and improve first-year grade point averages (Cabrera, Miner, and Milem 2013). Transition programmes thus seem to improve student–faculty and student–peer interactions, while enhancing participants' sense of belonging in HE. However, much of this research is descriptive. Transition programmes also seem to have an effect on academic performance, but results vary according to type of transition programme, measures adopted, and group characteristics (cf. Cabrera, Miner, and Milem 2013; Porter and Swing 2006). The current study, therefore, contributes to the knowledge regarding effective student transition support in HE by reporting on a quasi-experimental design study in which we investigated the effects of a Dutch, pre-academic (i.e. before starting at university) transition programme on first-year students' (1) interactions with faculty and peers, (2) sense of belonging, and (3) academic performance.

Transition to higher education

During the transition into HE, students seem to go through four phases (Coertjens et al. 2017; Nicholson 1990): preparation, encounter, adjustment, and stabilisation. In the preparation phase, students think about their degree choice and choose where to enrol and for which course programme. Upon acceptance, students are confronted with a new learning environment and an academic culture. During this encounter phase, they may experience friction between their personal learning beliefs and behaviour and the new learning environment, with its own specific academic culture (Van Asselt 2006). This friction influences the formation of their role as university student. Students develop their identity as university students, adopt their perceptions and behaviour regarding the new learning environment, and ideally create a supportive network to feel at home and successfully deal with the demands and opportunities in HE (Coertjens et al. 2017; Gale and Parker 2014). This encounter phase usually takes place during the first weeks at university. Adjustments in attitude and behaviour occur gradually during the first year, which represents the third phase of the transition process, the adjustment phase. Finally, when students experience broadly what kind of behaviour leads to satisfying social and academic outcomes, their attitudes and behaviour tend to stabilise (Christie et al. 2016). Stabilisation is the fourth and final phase in the transition process (Coertjens et al. 2017; Nicholson 1990).

In the present study, we examined the effects of an intervention designed to support students during the encounter phase of the transition into HE. This seems to be a particularly vulnerable time, yet it also represents a window of opportunity. In their first confrontation with HE, students experience a significant change in educational context. While learning to cope with the social and academic realms of the new learning environment (Scanlon, Rowling, and Weber 2007; Thomas 2002), they simultaneously need to feel related to the university community (Wilcox, Winn, and Fyvie-Gauld 2005; Wilson et al. 2014). Supporting students in coping with the HE community is important for successfully transitioning into HE (Coertjens et al. 2017; Gale and Parker 2014). The intervention is intended to enhance the encounter phase in the transition cycle by addressing students' beliefs and behaviour and by supporting their need to relate to the HE community (Slavich and Zimbardo 2012). More specifically, we hoped to encourage higher quality

interactions with peers and staff, an increased sense of belonging in HE, and improved academic performance.

Interaction, sense of belonging, and academic performance

Transitioning students seem to be particularly concerned about two aspects: developing a sense of belonging in HE and building relationships with peers and faculty within it (Gibney et al. 2011; Palmer, O'Kane, and Owens 2009; Tett, Cree, and Christie 2017; Walton and Brady 2017). A sense of belonging refers to feeling at home at university and that you fit in, that you are a member of one or more communities there, and that you are supported at the university (Hausmann, Ward Schofield, and Woods 2007; Hurtado and Carter 1997). Developing a positive sense of belonging in HE seems crucial for the decision not to leave when one experiences difficulties in adapting to the new environment (Christie, Munro, and Fisher 2004; Tinto 2012). People develop a sense of belonging by giving meaning to experiences in a setting (Walton and Brady 2017). In making sense of their belonging in HE, students seek to interpret both the new social context and themselves, including who they can be in that context (Walton and Brady 2017). Parsing the academic world is difficult, because the cues are vague or implicit (as with many everyday situations). How students perceive and interpret these cues depends on their personal history. This personal perspective shapes the risks and opportunities one sees in situations at university. Students who worry that people like them do not belong in HE may see everyday experiences, such as peer group work struggles, as confirmation of that perception. As a result, these students may not take advantage of opportunities for learning, such as discussing unclear learning material with peers, and they might not build the relationships with peers and teachers necessary for belonging and success (Walton and Brady 2017; Walton and Cohen 2007). To promote a sense of belonging and thus academic performance, it seems important therefore to encourage first-year students to be aware of their personal perception of the academic context (which is fuelled with, or filtered by, personal history). Furthermore, it seems important to decrease feelings of uncertainty and consequently keep students' minds (or perceptions) open for positive cues and experiences of belonging in HE by informing them that such self-doubts are common in the transition into HE (Walton and Brady 2017).

When people feel they belong in a setting, they tend to be more motivated to engage with others, as in making friends (Walton and Cohen 2007). Previous studies have shown that students' interactions with peers and faculty are important for their experiences in HE. Such interactions can take place formally or informally, either inside or outside of a classroom setting (Hagenauer and Volet 2014; Hommes et al. 2012; Pascarella and Terenzini 2005). Studies by Brouwer et al. (2016) and Wilcox, Winn, and Fyvie-Gauld (2005) showed, for example, that informal peer interactions (such as talking about personal matters) stimulate formal ones (i.e. talking about course-related issues) and vice versa, which both support academic performance at university. Hommes et al. (2012) found first-year student performance to be positively influenced by social networks (i.e. friendships, or giving/receiving information on course-related matters to or from peers). As well as positive relationships between student–peer interaction and academic performance, establishing a social network also provides students with a sense of belonging, which helps them assume the role of HE student (Buote et al. 2007; Hommes et al. 2012).

Next to student–peer interaction, research clearly shows the importance of student–faculty interaction in HE. Formal interactions of students with faculty members focused on academic development and performance seem most beneficial for students (e.g. giving clear instructions and stimulating meaningful learning) (Pascarella and Terenzini 2005; Schneider and Preckel 2017). These types of interactions contribute to students' satisfaction with the HE experience (Kim and Sax 2009), a stronger commitment to graduate (Pascarella and Terenzini 2005), lower attrition rates (Richardson and Radloff 2014), and higher college GPA (Kim and Sax 2009). Little research has focused on informal student–faculty interactions, as they seem to occur less often in HE settings (Cotten and Wilson 2006; Tett et al. 2017). However, Severiens and Wolff (2008) showed that when informal interaction does occur between students and staff (i.e. talking about personal matters or

well-being), it relates positively to average first-year grades. Both types of student–faculty interaction are also important in helping students to feel at home in HE. High-quality, formal interaction with faculty affects students' sense of belonging at university positively (Brooman and Darwent 2014; Kim and Lundberg 2016; Meeuwisse, Severiens, and Born 2010). Furthermore, feeling at home in HE is enhanced by informal contact with faculty outside the classroom, and by approachable tutors who are available to help students with personal and academic issues (Stephen, O'Connell, and Hall 2008).

The present study: Investigating the effects of a Dutch transition programme in a quasi-experimental design

Earlier studies have shown that it is beneficial to support transitioning students in getting to know their peers and the university community, in feeling at home in HE, and in performing well there (Ackermann 1991; Cabrera, Miner, and Milem 2013; Hausmann et al. 2009; Porter and Swing 2006). However, more quasi-experimental research is needed to corroborate the evidence of the effectiveness of transition programmes offered to HE students (cf. Coertjens et al. 2017; Pike, Hansen, and Lin 2011; Porter and Swing 2006; Sablan 2014). We used a quasi-experimental design to investigate if participation in a pre-academic transition programme was related to differences in interaction, sense of belonging, and academic performance among first-year Dutch students.

In the transition programme, we focused on enabling students to (1) interact with peers and faculty proactively and constructively, (2) to make connections with peers and the university (and thus create a feeling of belonging), and (4) to perform successfully at university. By intervening before students started their academic year, we aimed to offer them a head start in HE. Early in the transition cycle, we invited students to reflect on their own personal learning beliefs and behaviour, as well as on the demands and opportunities at university.

We formulated the following three hypotheses on the effects of our intervention:

Hypothesis 1 (H1): Students who participated in the transition programme (i.e. participants) showed a higher quality of (in)formal interaction with peers and faculty compared to students who did not participate in the transition programme (i.e. non-participants).

Hypothesis 2 (H2): Participants experienced a higher level of sense of belonging at university compared to non-participants.

Hypothesis 3 (H3): Participants performed better academically compared to non-participants.

Method

Participants and procedure

This quasi-experimental study was conducted at a law school at a large state-funded university in the Netherlands during the academic year 2013–2014. While applying for the full-time first-year bachelor programme in National Law, Financial Law, or Criminology, students could volunteer to participate in the intervention. Those who did (experimental group) were compared with students who did not (control group). The intervention was carried out two weeks before students started their first year at university.

The experimental group comprised 58 participants and the control group consisted of 237 participants (see Table 1). None of the participants had any previous experience in HE. Students in both groups completed a questionnaire while applying for the bachelor programme (pre-test) and during the last meeting of their first course (post-test). Questionnaire and academic results were linked through students' institutional identification number. Confidential use of the identification numbers was guaranteed.

Table 1. Background information of respondents in the experimental group and control group.

Background characteristics	Experimental group		Control group		Chi Square	df	p
	N	%	N	%			
Gender					3.07	1	.08
Male	14	24.1	86	36.3			
Female	44	75.9	151	63.7			
Total	58		237				
Ethnic background					.04	1	.84
Ethnic majority	40	72.7	157	71.4			
Non-Western ethnic minority	15	27.3	63	28.6			
Total	55		220				
Law school programme					.74	1	.39
National law / Financial law	43	74.1	162	68.4			
Criminology	15	25.9	75	31.6			
Total	58		237				
	N	M (SD)	N	M (SD)	T-test	df	p
Secondary school GPA	58	6.65 (.63)	62	6.59 (.52)	−.59	118	.56

The N varies due to missing values.

Intervention[1]

The four-day intervention is based on contemporary student learning theories (Schunk 2012; Slavich and Zimbardo 2012; Valcke 2010) and the interaction and sense of belonging theory as detailed above. The overall aim was to mitigate potential difficulties in transitioning into HE. More specifically, we tried to change students' perception of effective learning behaviour (such as high-quality interaction with fellow students and teachers) to increase their sense of belonging and academic performance. In addition, we tried to increase students' sense of belonging and thus the quality of their interactions by changing negative perceptions of the new learning environment, so that potentially unsettling social and academic experiences could be interpreted as normal difficulties of the transition into HE and not as evidence they did not belong or could not succeed there (cf. Walton and Cohen 2011; Walton and Brady 2017).

The intervention was designed using a two-step strategy, as suggested by Boersma et al. (2016). The first step consisted of formulating design principles on the basis of theoretical concepts deemed important in the literature (in our case interaction behaviour, sense of belonging, and academic performance). In the second step, these principles were translated to concrete work formats and activities. In the current intervention, the following design principles and related work formats and activities were formulated.

The first principle was that during the transition to HE, the development of student–faculty and student–peer interactions, students' sense of belonging, and academic performance is coloured by students' backgrounds, previous experiences, and personal perceptions (Chemers, Hu, and Garcia 2001; Kahu 2013; McInnis 2001; Scanlon, Rowling, and Weber 2007; Slavich and Zimbardo 2012; Tett, Cree, and Christie 2017; Thomas 2002; Tinto 1993). The intervention therefore focused on (a) participants' awareness of their personal background and identity and its influence on how they perceive current situations; (b) their awareness of their subjective perceptions and the correlation with interaction behaviour, sense of belonging, and performance; and (c) the possibility of influencing all of the above to enable them to be HE students and perform effectively (Erhard, Jensen, and Granger 2012; Walton and Brady 2017; Zaffron and Logan 2009). This principle was incorporated in the activities during the programme. In the lectures and assignments, participants were encouraged to reflect on how they perceive situations in the transition into HE; for example, their degree choice, their social identity, their personal values, their experiences with stereotyping, personal, familial and institutional expectations, and interaction patterns (related to education) (Cohen et al. 2006; Craig 1999; Slavich and Zimbardo 2012). It was explained to participants that awareness of their existing perceptions of degree choice, identity, values, and methods of interacting with other people (in an educational setting) facilitate but can also hamper their performance in HE, and that they can adapt

these perceptions to enhance it. Participants were encouraged to internalise these insights (cf. Walton and Cohen 2011) by writing them down in a daily diary during the intervention and by sharing them during assignments and lectures.

A second design principle was that studying at university is a social process (Slavich and Zimbardo 2012). Specifically, in this course programme the future learning environment of the students involved problem-based learning (PBL). In PBL, constructing the learning experience together stands central during learning activities, and teachers play a facilitating and coaching role (Severiens and Schmidt 2009). This design principle was translated into collaborative activities throughout the entire week. These activities aim to encourage interaction between peers and between peers and staff. During the first two days, participants engaged in four or five assignments per day, in pairs or in groups of four participants. They were encouraged to work together in pairs with a person they did not know. The groups were formed randomly, with group compositions varying daily. During the last two days, participants also worked in larger groups of 12 participants maximum, with the guidance of their future tutors.

A third design principle was that studying at university means taking responsibility for one's learning experience (McInnes 2001; Slavich and Zimbardo 2012). This design principle was translated into collaborative work sessions with peers, reflection, and formulating a personal declaration. Students were asked to formulate a declaration that focused on creating a personal state of mind (or perception) that would stimulate them to reach unprecedented achievements (Erhard, Jensen, and Granger 2012; Zaffron and Logan 2009). The approach is comparable to the work on possible selves as described, for example, by Hoyle and Sherrill (2006) and Oyserman, Bybee, and Terry (2006). Students were instructed and coached to formulate a declaration of *being* an HE student, which goes further than but still encompasses *knowing* how to be an effective HE student and studying (*doing*) effectively. For example, a student could state 'Discussing learning tasks with fellow students is important for academic performance' (knowing), or 'I discuss learning tasks with fellow students when I do not understand them' (doing). Students were coached to formulate declarations as a current state of mind, such as 'I am a student that discusses learning tasks with fellow students' (being); 'I stand for constructive discussions'; 'You can count on me for contributing positively and constructively to a discussion in class or outside class'; or 'I commit myself to be open for discussions'. By doing the above, we promoted a learning attitude that suited the student and could be fulfilled immediately (Erhard, Jensen, and Granger 2012; Zaffron and Logan 2009).

The intervention was conducted by two experienced trainers (MSc, with more than 10 years of experience with educational innovation in HE; PhD, with more than five years of experience with drop-outs and diversity issues in HE).

Measures

Interaction behaviour

In the problem-based learning context of the law school, we adapted established scales of interaction behaviour (Goodman 1997; Meeuwisse, Severiens, and Born 2010; Severiens and Wolff 2008) to assess formal and informal student–faculty interactions as well as formal and informal student–peer interactions. Interaction behaviour was measured with four scales (see Appendix 1). First, formal interaction with faculty was measured with seven items ($a_{exp} = .69$, $a_{contr} = .82$). A sample item is 'I go easily to my tutor if I have remarks or questions'. Second, informal interaction with faculty was assessed with five items ($a_{exp} = .66$, $a_{contr} = .77$), such as 'I have a positive relationship with at least one of my teachers in the course programme'. Third, formal interaction with peers was measured with eight items ($a_{exp} = .60$, $a_{contr} = .80$). A sample item is 'I invite fellow students to work together with me on assignments'. Fourth, informal interaction with peers was assessed with five items ($a_{exp} = .71$, $a_{contr} = .81$), such as 'I have close personal contact with fellow students'. The item responses for the scales ranged from 1 (*not true at all*) to 5 (*completely true*).

Sense of belonging

Based on the Sense of Belonging scale of the Meeuwisse, Severiens, and Born (2010), this aspect was measured with seven items (a_{exp} = .82 a_{contr} = .84) (see Appendix 1). An example item is 'I feel accepted by fellow students'. The response categories ranged from 1 (*never*) to 7 (*always*).

Academic performance

The following performance measures per respondent were obtained from the student registry: first-course grade and first-year cumulative GPA (both on a scale from 1 to 10), first-course and first-year retention (both passed yes/no).

Analyses

We used multivariate analysis of variance (MANOVA) to test our hypotheses of whether participants would show a higher quality of (in)formal interaction with peers and faculty (H1) and whether they would experience a higher level of sense of belonging (H2) compared to non-participants. To test our third hypothesis (whether participants would perform better academically compared to non-participants), we used MANOVA to test if they attained higher first-course grades and first-year cumulative GPAs than non-participants, and we used chi-square tests to analyse if participants passed the first course and the first year more often than non-participants. Effect sizes (ES) were calculated when a significant effect of the intervention was found ($p < .05$). An ES (Cohen's d) of about .10 is considered a small effect, an ES of about .30 a medium effect, and an ES of .50 or higher a large effect (Field and Hole 2002).

Results

Preliminary analyses

There were no significant differences between the experimental group and the control group on gender, ethnic background, first-generation HE, law school programme (see Table 1), and secondary school GPA (see *t*-test result in Table 2), which reduces the possibility of selection effects. Table 2 presents the mean scores, standard deviations, *t*-test results, and Spearman correlations of all dependent variables.

Formal and informal interaction with faculty and peers, and sense of belonging

The multivariate test regarding interaction behaviour and sense of belonging (Table 3) showed a statistically significant effect ($F = 3.95$, d$f = 5$, $p = .002$). The post hoc analyses showed that participants reported a higher quality of formal faculty interaction, formal peer interaction, and informal peer interaction than non-participants. In comparison to non-participants, students who took part in the intervention had better formal interactions with teachers about the law course programme ($F = 6.66$, d$f = 1$, $p = .010$, ES = .24), had better formal interactions with peers about matters related to it ($F = 6.70$, d$f = 1$, $p = .010$, ES = .25), and had better informal, social interactions with peers ($F = 13.13$, d$f = 1$, $p = .001$, ES = .33). All effects were small to medium, which means that participation in the intervention had a small to medium impact on these types of student–faculty and student–peer interactions. The post hoc analyses also showed that informal interaction with faculty was not statistically significant between the experimental and control group ($F = 2.63$, d$f = 1$, $p = .106$), which indicates that students in both groups reported a comparative quality of informal interaction with their teachers. Finally, sense of belonging did not differ statistically significantly between the experimental and control groups ($F = .25$, d$f = 1$, $p = .615$), suggesting that students in both groups felt equally at home at the university.

Table 2. Mean scores, standard deviations, t-values and Spearman correlations between all variables.

	Variables	M (SD) Experimental group	M (SD) Control group	t	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Formal faculty interaction	3.68 (.52)	3.38 (.68)	−3.14**	(−)	.51**	.37*	.24	.22	−.05	.06	.13	.02
2.	Informal faculty interaction	3.31 (.69)	3.08 (.80)	−1.62	.70**	(−)	.45**	.38**	.49**	−.26	−.00	.08	−.09
3.	Formal peer interaction	4.00 (.42)	3.74 (.59)	−3.31**	.50**	.41**	(−)	.56**	.43**	−.20	−.06	−.08	−.08
4.	Informal peer interaction	4.31 (.51)	3.87 (.72)	−4.64***	.45**	.41**	.75**	(−)	.71**	−.35*	−.05	.02	.02
5.	Sense of belonging	5.72 (.73)	5.65 (.80)	−.50	.37**	.29**	.63**	.59**	(−)	−.19	−.01	.14	−.05
6.	First-course grade	6.36 (1.16)	5.69 (1.16)	−3.88***	.05	−.03	.01	−.03	.02	(−)	.64**	.75**	.51**
7.	First-year cum. GPA	6.44 (1.03)	6.07 (1.03)	−2.45*	.02	.05	.05	.02	−.02	.63**	(−)	.55**	.63**
8.	First-course retention	1.79 (.41)	1.59 (.49)	−3.07**	.10	.01	.08	.04	.06	.89**	.50**	(−)	.60**
9.	First-year retention	1.84 (.37)	1.74 (.44)	−1.92	.02	.03	.13*	.09	.06	.43**	.71**	.37**	(−)

Note: Correlations for experimental group are presented above the diagonal, correlations for the control group below the diagonal.
Variable 1 to 5: 1–5 scale. Variable 6 and 7: 1–10 scale. Variable 8 and 9: 1 = not passed, 2 = passed.
*p < .05; **p < .01; ***p < .001

Table 3. Multivariate analyses of variance: differences in interaction behaviour and sense of belonging between the experimental group and control group.

	Df	F	Partial η^2	p	Adjusted R^2	Effect size
Multivariate test[a]	5	3.95	.07	.002		
Between subjects						
Formal faculty interaction	1	6.66	.02	.010	.02	.24
Informal faculty interaction	1	2.63	.01	.106	.01	
Formal peer interaction	1	6.70	.02	.010	.02	.25
Informal peer interaction	1	13.13	.05	.001	.04	.33
Sense of belonging	1	.25	.00	.615	−.01	

[a]Observed power = .945.
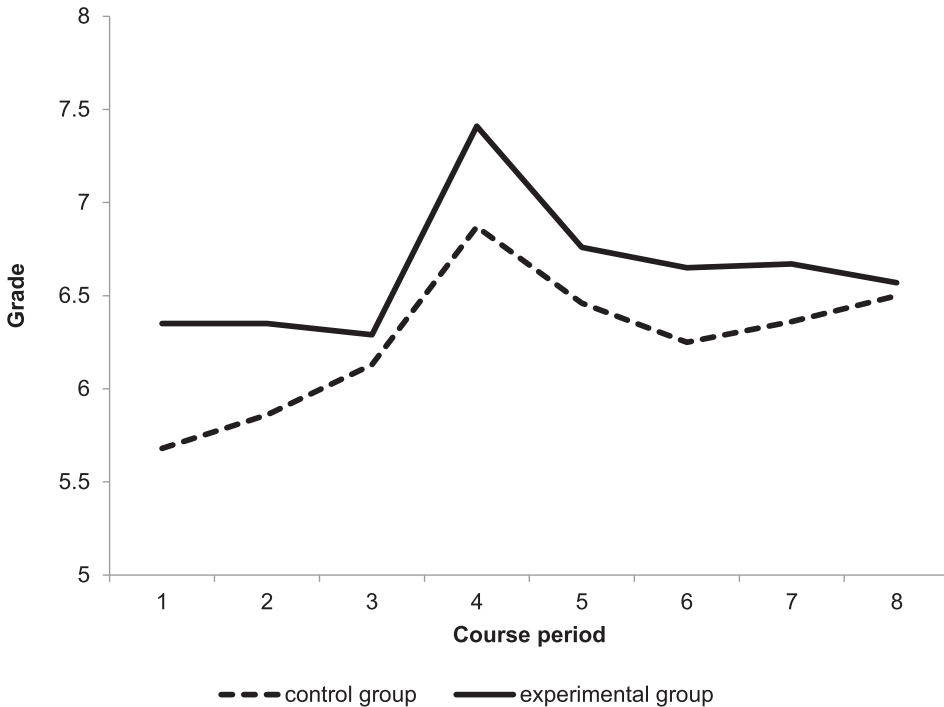
Figure 1. Attained average grade per first-year course in control and experimental group.

Academic performance

Descriptive results of the average grades per course (see Figure 1) showed that participants seemed to have gotten a head start compared to non-participants. Participants attained higher average grades starting from the first course, and maintained them until the second to last course in the first year. More importantly, participants attained sufficient grades (6.0 or higher) right from the start, whereas non-participants, on average, attained sufficient grades only after two courses. However, Figure 1 shows that non-participants had better grades during the last two courses, whereas participants more or less stayed at the same performance level during the last four courses.

A multivariate test showed that the intervention had a statistically significant effect on students' academic performance in the first year ($F = 47.71$, df = 2, $p = .001$; see Table 4). Participants attained statistically significantly higher grades in the first course than non-participants ($F = 15.03$, df = 1, $p = .001$, ES = .28), namely, 6.36 versus 5.69 on a scale from 1 to 10. The multivariate test also showed that first-year cumulative GPA differed significantly between the experimental and control students ($F = 5.26$, df = 1, $p = .023$, ES = .36), indicating that students in the experimental

Table 4. Multivariate analyses of variance: differences in first-course grade and cumulative GPA between the experimental group and control group.

	Df	F	Partial η^2	p	Adjusted R^2	Effect size
Multivariate Test[a]	2	7.71	.05	.001		
Between subjects						
First-course grade	1	15.03	.05	.001	.05	.28
Cumulative GPA	1	5.26	.02	.023	.02	.36

[a]Observed power = .948.

Table 5. Chi Square test results of research group by first-course retention and first-year retention.

	Experimental group		Control group				
	N	%	N	%	Chi Square	df	p
First course retention					7.46	1	.006
Not passed	12	21.1	94	40.5			
Passed	45	78.9	138	59.5			
Total	57		232				
First-year retention					2.94	1	.086
Not passed	9	15.5	62	26.3			
Passed	49	84.5	174	73.7			
Total	58		236				

The N varies due to missing values.

group attained higher cumulative GPA scores in the first year at university than those in the control group.

We conducted chi-square tests to analyse the chance of passing the first course (yes/no), and of passing the first year (yes/no). The results, as presented in Table 5, show that the chance of passing the first course was significantly different between the experimental and control groups (*chi square* = 7.46, d*f* = 1, *p* = .006). Students in the experimental had a higher chance of passing the first course than students in the control group. A second chi-square test showed that the chance of passing the first year did not differ significantly between the groups (*chi square* = 2.94, *p* = .086).

In summary, our first hypothesis was confirmed for three of the four types of interaction behaviour. In contrast to non-participants, students who participated in the transition intervention reported a higher quality of formal interaction with faculty and peers and a higher quality of informal interaction with peers. The second hypothesis was not confirmed: participants did not experience a higher level of sense of belonging at university than non-participants. The third hypothesis was mostly confirmed. Participants seem to have received a head start in HE that lasted throughout the first year. They got higher grades in the first course, had a higher chance of passing the first course, and attained a higher cumulative GPA in the first year than non-participants.

Discussion

The present study investigated the effects of a transition intervention programme that aimed to enhance students' formal and informal interaction with peers and faculty, their sense of belonging in HE, and their first-year academic performance.

The intervention seems to have been successful in its goal of enabling students to engage more in peer interaction (H1) – that is, in approaching fellow students to study course material or work on assignments together. In addition to these formal forms of student–peer interaction, the results also showed that participants were more inclined than non-participants to initiate informal interaction. Previous research has shown that social interactions among peers is important for success in the first year of HE (Brouwer et al. 2016; Buote et al. 2007; Wilcox, Winn, and Fyvie-Gauld 2005), and that transition programmes can enhance the feeling of being adequately prepared to

interact with peers, which in turn positively impacts students' intention to persist (Porter and Swing 2006). Our study strengthens the evidence base in this literature, by using a control group to compare the impact of the intervention on student–peer interaction among participants and non-participants.

In addition to more peer interactions, participants in the intervention reported more formal interaction with faculty than non-participants did (H1). Our intervention had a positive effect on the contact between students and their teachers on course-related matters. Although previous studies have shown the importance of student–faculty interaction for learning and performance (Schneider and Preckel 2017), and the effect of transition programmes on academic outcomes (e.g. Cabrera, Miner, and Milem 2013; Porter and Swing 2006), as far as we know no previous study has reported on the impact of a transition programme on course-related student–faculty interaction.

However, we found no significant difference between the experimental and the control group on informal interaction with faculty (H1). Apparently, the intervention did not facilitate the relationship between the participants and the teachers enough to enhance informal contact between them. A possible explanation may be that our measure of informal student–faculty interaction was not accurate enough. As such interactions do not seem to occur frequently (Cotten and Wilson 2006; Tett et al. 2017), a sensitive instrument is crucial. Another explanation could be that the curriculum of the course programme did not provide enough room to create a safe or inviting environment for students to share personal things with their teachers. Previous research has shown that class time is scarce in HE and that it is mainly focused on course-related interactions (Cotten and Wilson 2006).

We found no support for our second hypothesis, that participation in the intervention leads to a higher sense of belonging at university. A ceiling effect due to the measurement moment may explain this result. Sense of belonging was measured at the end of the first five-week course. After five weeks of studying, scores on sense of belonging were above 5.5 on a scale from 1 to 6 in the experimental as well as in the control group. This parity indicates that all students felt quite at home in HE by that time. Additionally, as shown in earlier research (e.g. Walton and Cohen 2011), not feeling at home in HE is more typically experienced among socially marginalised groups and the ceiling effect was possibly also due to the fact that our sample does not include sufficient percentages of these groups. Unfortunately, differences between groups according to social capital could not be investigated due to the small experimental group size in the present study.

Hypothesis 3 was mostly confirmed, as three of four expected effects were found. We found a positive impact of the intervention on first-course grades, as well as on the first-year cumulative GPA and first-course retention. As with many interventions, selection effects could have contributed to this difference. However, no significant differences emerged between the experimental and control groups on the background factors of gender, ethnic background, first-generation HE, law school programme, or secondary school GPA. Therefore, we conclude cautiously that the intervention contributed to a head start in the first year. Cautiously, because selection effects on the basis of other factors (e.g. motivational orientation) might still be at hand. Contrary to our expectations, we found no significant difference in first-year retention. The relatively high cumulative GPAs of participants did not result in more retention. This could suggest that non-participants took more time to adapt their performances and improved their performance during the first year to have an equal chance to pass the first year as participants by the end of the first year. In their systematic review of factors related to first-year students' success, Van Rooij et al. (2018) explained various underlying processes of performance versus retention (or dropping out) and progress. For example, students with a high GPA may choose to quit the programme deliberately due to dissatisfaction with it. Or psychosocial factors such as motivation may cause students to put in minimal effort – resulting in a GPA that is low but is nonetheless sufficient for them to continue. More research is warranted into these underlying processes, as they may explain why we observed different results with regard to different measures of study success.

Limitations and directions for future research

Our findings are limited firstly because our experimental group was relatively small and consisted of volunteer participants. Furthermore, as described above, self-selection may have happened to some extent. Future research should control for possibly relevant factors; preferably, it should assign interested students randomly to either an experimental or a control intervention. Secondly, the findings on interaction behaviour may be somewhat limited by the scale reliability found within the experimental group. Additional research should be conducted to confirm the consistency of our measures on formal peer interaction and (in)formal faculty interaction. Finally, it is worth noting that we found effect sizes between .24 and .36 of the intervention on student–faculty interaction, student–peer interaction, first-course grade, and first-year cumulative GPA. To improve the intervention further, and possibly increase its effects, it could be helpful to investigate the underlying mechanisms with a qualitative study. An interview and observation study could give deeper insights into (1) the effect of the intervention on participants' sense of belonging and perception/implementation of interaction behaviour and (2) how these elements affect their performance. Additionally, insight into how these connections differ among participants and non-participants would be valuable for educational research and practice.

Implications

Although this study focused on one school and one cohort only, the findings contribute to knowledge on the effectiveness of transition programmes in HE. As studies in this field are few, we applied a quasi-experimental research design to show the effect of our intervention on first-year academic performance more rigorously. Moreover, we explored the effect on interaction behaviour and sense of belonging among participants and non-participants. Notwithstanding its limitations, this study suggests that formal student–faculty interaction and (in)formal student–peer interaction can be enhanced by a short transition intervention. Although transition programmes offered during the academic year can also benefit students (e.g. Porter and Swing 2006), a short, pre-academic programme as implemented in this study could work as a springboard to help students make useful connections with others.

Another implication of this study is the possibility of increasing first-year academic performance among students from the start of their academic career. In the Netherlands, but also in other countries around the world, performance-based state funding influences enrolment and degree completion policies at HEIs (European Commission 2015; Inspectie van het Onderwijs [Dutch Inspectorate of Education] 2017; Hillman, Tandberg, and Gross 2014). In other words, it is important for students to make a good start in HE. While further investigation is needed on processes underlying retention, our study suggests that an intervention early in the transition cycle, which is focused on enabling students to interact constructively and proactively with peers and faculty, does indeed give them a head start in HE.

Conclusion

This study showed that a four-day intervention to ease the transition of first-year students into HE enhances formal student–faculty and student–peer interactions, as well as informal student–peer interactions. In addition, participation in the intervention influenced the grades students' attained in the first course positively, as well as their first-year cumulative GPA. The head start in HE given these students by the pre-academic programme lasted throughout the year. The findings are relevant for developing effective transition programmes and for increasing academic performance in HE.

Note

1. Detailed content of all didactic sessions is available from the authors.

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Appendix 1

Individual scale items

Scale	Items
Formal faculty interaction ($k = 7$)	*Interaction between students and faculty about study-related matters*
	I take my tutor's questions seriously.
	I attract my tutor's attention if I have a question.
	I go easily to my tutor if I have remarks or questions.
	I learn a lot from the tutor.
	I talk to the tutor about my gained insights.
	I talk to my tutor about my progression in my studies.
	My contact with the tutor has a positive influence on my academic performance.
Informal faculty interaction ($k = 5$)	*Interaction between students and faculty with a personal approach*
	I say hello when I meet my tutor outside the classroom.
	I sometimes share personal stories with the tutor.
	I have a positive relationship with at least one of my teachers in the course programme.
	I know the names of my teachers.
	Sometimes I talk to my tutor about personal matters.
Formal peer interaction ($k = 8$)	*Interaction among students about study-related matters*
	I talk to fellow students and discuss course material or assignments.
	I mainly worked alone in this course (reverse scored).
	I like getting feedback from fellow students.
	I invite fellow students to work together with me on assignments.
	I listen to the remarks of fellow students.
	I find it difficult to find (a group of) fellow students with whom I can work together (reverse scored).
	I think contact with fellow students helps me to get better grades.
	I work well together with fellow students.
Informal peer interaction ($k = 5$)	*Interaction among students with a personal approach*
	I am interested in my fellow students.
	I hardly know anyone in my course programme (reverse scored).
	I am engaged with my fellow students.
	I invite fellow students to spend time together.
	I have close personal contact with fellow students.
Sense of belonging ($k = 7$)	I feel I can be myself at this university.
	I feel that I fit in with the other students at this university.
	I can talk with fellow students about my interests and activities.
	I feel that my family values are accepted by fellow students.
	My appearance (language, accent, looks) is accepted by fellow students.
	I feel accepted by fellow students.
	I feel that I belong in this course programme.

k = number of items per scale.