1   **Effects of emotional intelligence and supportive text messages on academic outcomes in**

2   **first year undergraduates**

3   Kevin Deighton[a], Joanne Hudson[a,b], Andrew J. Manley[a], Mariana Kaiseler[a], Laurie B.

4   Patterson[a], Zoe H. Rutherford[a] and Michelle Swainson[a]

5   [a]Institute for Sport, Physical Activity & Leisure, Leeds Beckett University, LS6 3QS, United

6   Kingdom.

7   [b]Applied Sports Technology, Exercise and Medicine Research Centre, Swansea University,

8   SA1 8EN, United Kingdom.

9   **Telephone numbers and email addresses**

10   Kevin Deighton (+44 (0)113 812 3582; K.Deighton@leedsbeckett.ac.uk).

11   Joanne Hudson (+44 (0)1792 513162; Joanne.Hudson@swansea.ac.uk).

12   Andrew J. Manley (+44 (0)113 812 4717; A.J.Manley@leedsbeckett.ac.uk).

13   Mariana Kaiseler (+44 (0)113 812 4026; M.H.Kaiseler@leedsbeckett.ac.uk).

14   Laurie B. Patterson (+44 (0)113 812 4007; L.Patterson@leedsbeckett.ac.uk).

15   Zoe H. Rutherford (+44 (0)113 812 4021; Z.H.Rutherford@leedbeckett.ac.uk).

16   Michelle Swainson (+44 (0)113 812 4010; M.Mellis@leedsbeckett.ac.uk).

17   **Corresponding author:** Dr Kevin Deighton, Institute for Sport Physical Activity & Leisure,

18   Leeds Beckett University, Leeds, LS6 3QS, United Kingdom (phone: +44 (0)113 812 3582;

19   email: K.Deighton@leedsbeckett.ac.uk).

20

21   **Running head:** Supportive intervention and student outcomes

22

23   **Word count:** 5876 words.

24 **Abstract**

25 An increase in the number of students entering higher education has intensified the need for

26 targeted strategies to support a wider range of student requirements. Current research suggests

27 that emotional intelligence (EI) may be associated with academic success, progression and

28 retention in university students but the use of EI screening as a prospective measure of success

29 requires further investigation. This study evaluates the utility of prospective EI screening to

30 predict progression rates, mean grades, attendance and online engagement in a sample of first

31 year undergraduate students enrolled on the same degree programme (n=358). A supportive

32 text messaging intervention was employed during potentially stressful periods of the academic

33 year in a subsection of participants (n=60) that demonstrated low total EI scores relative to the

34 cohort. Results showed no effects of EI classification on progression rates, mean grades,

35 attendance and online engagement (all P>0.418). Alternatively, the text messaging intervention

36 was associated with significant improvements compared with a matched control group for

37 progression rates (P=0.027), mean grades (P=0.026) and attendance (P=0.007). The frequency

38 of access to the virtual learning environment also tended to be higher in the intervention group

39 compared with the control group (P=0.059). In conclusion, this study did not identify any

40 benefits of EI screening as a prospective indicator of student success but provides encouraging

41 indications that a text messaging support intervention could help to improve progression rates,

42 mean grades, attendance and online engagement in first year undergraduate students. Further

43 research is warranted to develop these proof-of-concept findings.

44

45 **Key words:** engagement; attendance; grades; progression, support; academic achievement
46

Introduction

The past two decades have witnessed a significant increase in the number of students entering higher education (HE) in the UK. This is demonstrated by the Higher Education Statistics Agency (HESA) who recorded a rise in the number of students enrolling for their first degree from 313,589 in 1996 to 542,575 in 2015 (HESA 1998, 2017). Such widening participation in HE has been maintained in recent years despite the majority of institutions increasing undergraduate tuition fees to £9000 per year and it appears that numbers will remain high for the foreseeable future. In this regard, the continued recruitment of a large number of undergraduate students has been encouraged by the relaxation of government controls over the number of students recruited by institutions, with the complete removal of government controls on recruitment in 2015 being associated with a further small rise of 3% for the number of first degree enrolments (HESA 2017). The increased diversity of university students that accompanies these increased student numbers is acknowledged to broaden the range of student support needs to maximise engagement, progression and academic success (Crozier et al. 2008; Harper & Quaye 2014).

The positive relationship between student engagement, retention and success during HE is well-established and has stimulated a growing focus for institutions to develop evidence-informed resources to enhance the engagement of university students (Thomas 2012; Trowler 2010). This focus has been particularly aimed at first year students due to the elevated risk of low levels of engagement with the learning environment and increased attrition in this cohort during the transition from school to university (Schneider 2010; Trotter & Roberts 2006). In addition to institutions shaping the HE context to facilitate academic engagement, a growing body of evidence has explored the influence of students' existing emotional and social competencies in aiding them in the transition into, and through, university-level study (Keefer et al. 2012; Richardson et al. 2012).

72 The definitions of academic achievement and academic success remain debated and these

73 concepts are often used interchangeably within the research literature. Acknowledged

74 definitions of student success are typical broad, as described by Kuh et al. (2006, p.5) as

75 "academic achievement, engagement in educationally purposeful activities, satisfaction,

76 acquisition of desired knowledge, skills and competencies, persistence, attainment of

77 educational outcomes, and post-college performance". The focus of EI research on student

78 outcomes during their first year at university often precludes the assessment of post-college

79 performance but instead focus on the mean grade achieved by students during an academic

80 year and/or the progression rates of students to the subsequent year of study (Parker et al. 2004,

81 2005, 2006; Qualter et al. 2009). This also aligns with the findings of a recent literature review

82 which identified that academic achievement is the most frequently used assessment of

83 academic performance in previous research and that this was almost entirely measured as the

84 grades achieved by the students (York et al. 2015). In accordance with the definition provided

85 above, measures of progression and engagement were also frequently identified within the

86 literature (York et al. 2015). The use of these most commonly employed assessment methods

87 were prioritised in the present study to facilitate comparisons with previous research within the

88 topic and due to the easily quantifiable and accessible nature of these data.

89 Emotional intelligence (EI) has generated significant attention as an explanatory variable for

90 important life outcomes, including the extent to which students succeed and progress during

91 their studies at university (Parker et al. 2011). The exact definition of EI and the most

92 appropriate methods for assessing this construct remain highly debated, with some authors

93 considering EI to be an ability-based measure (e.g., Mayer et al. 2008), while others have

94 promoted EI as a trait-based measure (e.g., Petrides, Pita, & Kokkinaki 2007). In accordance

95 with these perspectives, ability-based measures of EI focus on emotion-related cognitive skills,

96 whereas trait-based measures of EI are assessed using self-report questionnaires, similar to

97   other personality variables. Although the broad and varied definitions of EI have attracted

98   criticism from some scholars (e.g., Locke 2005), both the ability and trait aspects of EI have

99   been linked with substantive outcome criteria. The focus of the current investigation will be on

100 trait EI due to the established relationship between trait EI and academic success in North

101 American universities (Parker et al. 2004, 2005). In this regard, high achieving first year

102 university students demonstrated greater self-reported EI scores on enrolment to university

103 compared with lower achieving students (Parker et al. 2004, 2005). These findings are based

104 on assessments using the EQ-i:S (Bar-On 2002) which comprises four broad EI dimensions of

105 intrapersonal, interpersonal, adaptability, and stress management. The subsequent validation

106 of these scales in undergraduate students (Parker et al. 2011) further supports this approach to

107 assessing EI, which may accordingly be defined as: "the interrelated emotional and social

108 competencies, skills and facilitators that determine how effectively we understand and

109 express ourselves, understand others and relate with them, and cope with daily demands"

110 (Bar-On 2006, p.3). The development of such self-report methods also allows for large cohorts

111 to be screened which may help to prospectively identify students with lower levels of EI upon

112 entry to university and enable targeted interventions to provide further support during their

113 studies.

114 In addition to maximising academic performance, screening students for EI at the beginning of

115 their university studies could also be beneficial for identifying students with an increased risk

116 of attrition to enable more targeted support interventions. In this regard, preliminary evidence

117 from individual UK and Canadian universities has demonstrated higher total self-reported EI

118 scores in students who progressed from the first to second year of university study compared

119 with students who withdrew from their respective degree programme (Parker et al. 2006;

120 Qualter et al. 2009). Although EI is likely to be only one aspect of a multitude of reasons for

121 differences between students' progression and attrition rates, this represents an easily

122   quantified variable that can be targeted to improve student outcomes. When considering other

123   factors that influence progression and attrition rates, it is widely acknowledged that the

124   motivation and opportunity for students to succeed within education is considerably influenced

125   by the context of an individual's personal and social circumstance (Cartney & Rouse 2006;

126   Haggis 2004). Specifically, the extent to which students feel socially integrated and connected

127   within the university environment is positively associated with student progression (Christo &

128   Oyinlade 2015; Lockhart 2004; Wilcox et al. 2005). The socio-economic circumstances of

129   students have also been shown to be predictive of progression and academic achievement as

130   recently reported by Crawford (2014). This report evaluated English-domiciled students who

131   attended any UK university for the first time at age 18 or 19 between 2004-05 and 2009-10,

132   with each cohort including between 180,000 and 235,000 HE participants. The socio-economic

133   background of students was established by combining individual and neighbourhood level data,

134   with the findings demonstrating that students from the highest socio-economic quintile group

135   were approximately 3.4 percentage points less likely to withdraw from their studies, 5.3

136   percentage points more likely to complete their degree and 3.7 percentage points more likely

137   to graduate with a First or 2:1 degree classification than those from the lowest socio-economic

138   quintile group. Similar degree completion rates and attrition differences between socio-

139   economic groups have been reported in Australian universities which demonstrates the

140   international relevance of this issue (Edwards & McMillan 2015). Although EI is the focus of

141   the present study, further research should aim to develop interventions to support students in

142   relation to these other predictors of progression and academic achievement.

143   Targeted interventions to support students with lower EI scores on entry to university are

144   promising and have primarily focussed on peer-mentoring from older students at the university.

145   In a Canadian university, this approach has been shown to reduce attrition in students who

146   received peer-mentoring either during the summer break at the end of their first year of study

147   or throughout the full academic year (Philippi, Kristensen, and Taylor 2012). These beneficial

148   effects were substantial with an attrition rate approximately 10% lower than a control group of

149   students with similar EI scores that did not receive peer-mentoring. These findings have been

150   further substantiated at a UK university where peer mentoring and the completion of activities

151   to improve EI in students with low baseline scores increased retention rates by approximately

152   25% compared with a cohort that did not receive the intervention (Qualter et al. 2009).

153   The benefits of peer-mentoring for students with low EI scores is encouraging. However, it

154   must be acknowledged that this intervention has resource implications regarding staffing and

155   time commitments which may not be feasible for all institutions. Recent developments within

156   the field of physical activity has demonstrated the utility of targeted text messages to increase

157   participants' feelings of support and improve the continuation of increased physical activity

158   levels in response to an exercise intervention (Kinnafick, Thøgersen-Ntoumani, and Duda

159   2016). These findings demonstrate the potential application of a supportive, yet generic, text

160   messaging intervention to improve persistence with a new behaviour within an unfamiliar

161   environment. This has many similarities with the behavioural changes required for an effective

162   transition and learner success in an unfamiliar HE environment (Briggs et al. 2012) and

163   subsequently it seems feasible that similar interventions could also assist students during their

164   transition to university and through their first year of study. This would also represent a cost-

165   effective method to highlight the support that is available to students and encourage students

166   to seek assistance if required.

167   The purpose of the present study was to further investigate the relationship between the EI

168   scores of students on enrolment to university and measures of academic attainment,

169   engagement and retention during their first year of study. From this sample, we also aimed to

170   establish whether a text messaging intervention can improve student outcomes in those who

171   demonstrated low EI scores on enrolment. This research will add to the limited understanding

172   of the relationship between EI scores and academic outcomes in UK universities, as well as

173   evaluating the effectiveness of a novel low cost intervention to improve academic outcomes in

174   students with low EI scores. In contrast to previous research, this study utilised a cohort of

175   students that were enrolled on the same degree programme in the same year and who were

176   required to complete the same six 20 credit modules for their first year of study. This novel

177   population allowed further investigation into the role of EI on student outcomes without the

178   confounding influence of students having different enrolment dates, studying different modules

179   or studying for different degree programmes. We hypothesised that students with higher EI

180   scores on enrolment would achieve higher grades and have higher levels of engagement and

181   retention than students with lower EI scores. We also hypothesised that the provision of

182   supportive text messages would improve academic attainment, engagement and retention in

183   those students with low EI scores on enrolment.

184   **Materials and methods**

185   *Participants*

186   All first year BSc Sport & Exercise Science students at the same university in the UK were

187   invited to participate in the study in October 2015. From the cohort of 420 students, 358

188   students provided written informed consent for their data to be used within the study. All

189   participants would be expected to graduate from their three year degree programme in 2018.

190   To ensure that students did not feel coerced into giving consent, they were informed that student

191   IDs would be used to store data and to track student activity and engagement with support and

192   Virtual Learning Environment (VLE) services. Ethical approval for the study was granted by

193   the Faculty Local Research Ethics Committee.

194

195   *Context*

196   This research was embedded within one of the six compulsory 20 credit first year modules on

197   the BSc Sport & Exercise Science course titled 'Introduction to Research and Study Skills'

198   (IRSS). The module spanned both semesters and focused on developing academic and study

199   skills in semester one, while providing an introduction to research methods and data analysis

200   in semester two. The module structure included biweekly keynote lectures and weekly seminars

201   delivered to each group by their personal tutor. Each tutor group contained approximately 20

202   students and there were 20 tutor groups for the cohort (groups A-T). Staff teaching on the

203   module were briefed about the research study and its use as a stimulus for students' personal

204   reflection and planning during the IRSS module.

205   ***Procedures***

206   *Emotional Intelligence Profiling*

207   During the first week of semester one, all participants completed an online version of the EQ-

208   i:S (Bar-On 2002) during their IRSS seminar session. Based on its factor structure and

209   associations with conceptually similar measures (ability-based EI and alexithymia), Parker et

210   al. (2011) have demonstrated the conceptual and theoretical integrity and the discriminant and

211   convergent validity of the EQ-i:S.. For total EI scores and individual subscales, test-retest

212   correlation coefficients, obtained from administrations six months apart, of 0.60 and above

213   supported its temporal reliability, and, Cronbach's alpha values over 0.75 indicated the

214   measure's internal reliability. This measure has been associated with academic success and

215   retention in universities in North America (Parker et al. 2004, 2005, 2006).

216   The EQ-i:S includes 51 items that represent six subscales, four of which were used to determine

217   a total EI score in accordance with previous research (Keefer et al. 2012). These four subscales

218   (comprising 35 items) were used in the current study and are as follows: Interpersonal skills

219   (10 items assessing social awareness and ability to establish and be part of social relationships);

220   Intrapersonal skills (10 items assessing self-awareness and the ability to recognise and

221   effectively manage one's self-expression); Stress management (8 items assessing the ability to

222   manage and regulate emotions); and Adaptability (7 items measuring the ability to adapt to

223   change and solve personal and interpersonal problems).

224   Example items from each subscale are: 'I like helping people' (Interpersonal); 'I'm unable to

225   express my ideas to others' (Intrapersonal; reverse scored item); 'It is a problem controlling

226   my anger' (Stress Management; reverse scored item); 'My approach in overcoming difficulties

227   is to move step by step' (Adaptability). Respondents indicate their responses using a 5-point

228   Likert scale anchored by 1 (*Very seldom true of me*) and 5 (*Very often true of me*).

229   Students confidentially received their individual EQ-i:S results during the fourth IRSS seminar

230   in semester one. This session also provided an explanation of the concept of emotional and

231   social skills, the different elements that the scores on the EQ-i:S represented, and evidence

232   supporting the link between emotional intelligence and outcomes in academia. Students were

233   encouraged to consider the relevance of these skills to help them manage the transition to

234   university and to reflect on their personal profiles to establish areas of strength and areas for

235   improvement. It is important to note that the entire cohort for the degree programme completed

236   the EQ-i:S and attended the feedback session as part of the IRSS module provision but data

237   was only used in the present study for those who provided consent.

238   *Group Allocation*

239   The participants were separated into thirds based on their total EQ-i:S scores (i.e. highest,

240   middle and lowest thirds). Students in the lowest third for EQ-i:S scores were selected for the

241   intervention based on evidence that lower scores increase the risk for attrition and lower

242   academic performance (Parker et al. 2004, 2006), therefore suggesting that these students may

243 benefit most from the intervention. To robustly investigate the effects of the intervention,

244 students in the lowest third were quasi-randomised into either a control or intervention group

245 based on their tutor group. In this regard, those in the lowest third in tutor groups A-J received

246 the intervention, while those in the lowest third in tutor groups K-T acted as control participants

247 without any intervention. The assignment of these students to a non-intervention control group

248 enabled accurate assessment of the text messaging intervention but also provided the

249 opportunity to investigate the relationship between EI scores and student outcomes without

250 there being any contamination of the data from the intervention. In this regard, the 168 students

251 from tutor groups K-T provided a large sample of students to accurately assess differences in

252 student success outcomes across the different EI tertiles without any intervention. The control

253 and intervention groups were matched for EQ-i:S scores (mean (SD); Intervention: 103 (4);

254 Non-intervention: 103 (5)) and 60 participants were included in each group.

255 *Intervention*

256 Participants in the intervention group received three text messages from the Faculty Student

257 Liaison Officer (SLO) at pre-identified time points throughout the year. These time points

258 represented potentially stressful periods for the students and were as follows: November 2015

259 (prior to the semester one assessment period); February 2016 (the beginning of semester two

260 and at the time of results feedback from semester one); and April 2016 (prior to the assessment

261 period for semester two). The text message reminded students of the pastoral, academic and

262 personal support that was available within the faculty and the university with a hyperlink to

263 details about these services. The message also invited students to 'drop-in' or make an

264 appointment to see an SLO using the hyperlink provided. Messages were tailored to match the

265 time of year at which they were sent, for instance, referring to preparing for examinations,

266 considering assessment results and preparing for the upcoming semester. Although these

267   services were available to all students within the faculty, the intervention highlighted the

268   availability of the services and made an explicit offer for the students to use this support.

269   *Monitoring of Outcomes*

270   Attendance registers were collected during all seminar sessions for the IRSS module and

271   collated at the end of the academic year. The number of times that the participants accessed the

272   IRSS module content on the VLE was also monitored and collated throughout the year as a

273   marker of student engagement. The mean grade achieved by the participants for their first year

274   modules and the successful completion of first year studies for progression to the second year

275   of the degree programme were obtained from the annual examination board statistics.

276   Progression to the second year of the degree required a mean grade of 40% or higher for the

277   first year modules, with a minimum grade of 40% in five modules and a minimum grade of

278   30% in the remaining one module.

279   *Data Analysis*

280   Data were analysed using IBM SPSS statistics version 22 for Windows and all data are

281   presented as mean (SD). Participants were divided into tertiles based on their ranked total EI

282   score to produce highest, middle and lowest thirds. The threshold values for each third were

283   calculated based on the scores from the entire cohort of the degree programme. Where the

284   threshold value for each third contained multiple participants all participants were retained

285   within the relevant third.

286   One-way ANOVA with post-hoc independent samples t-tests was used to assess differences

287   between tertiles for EI subscales, attendance, VLE access and the mean grade achieved during

288   the year. Differences between the intervention and non-intervention groups for attendance,

289   VLE access and the mean grade achieved during the year were assessed using independent

290   samples t-tests. Progression and withdrawal data were entered in binary form and compared

291   between tertiles and between the intervention and non-intervention groups using the Chi-

292   squared test. Statistical significance for this study was accepted as $P < 0.05$.

293

294   **Results**

295   *Baseline data*

296   Total EI scores for the A-J and K-T tutor groups were comparable at baseline (Highest third:

297   122 (6) vs. 125 (6); Middle third: 112 (2) vs. 113 (2); Lowest third: 103 (4) vs. 103 (5) for the

298   A-J and K-T tutor groups, respectively). The number of students in the A-J and K-T tutor

299   groups was also similar at baseline (Highest third: 53 vs. 50; Middle third: 77 vs. 58; Lowest

300   third: 60 vs. 60 for the A-J and K-T tutor groups, respectively). The scores for each subscale

301   of the EQ-i:S were significantly different between tertiles in accordance with the total EI scores

302   (all $P < 0.0005$; Table 1).

303   *Progression rates*

304   Chi-squared test revealed a trend towards a difference in progression rates to the second year

305   of the degree programme between tertiles when assessed as an entire cohort. This indicated

306   higher progression rates in the lowest third than the highest and middle thirds ($P = 0.077$;

307   Highest third: 67%; Middle third: 67%; Lowest third: 78%; Figure 1a). This trend was

308   consistent within tutor groups A-J ($P = 0.092$; Highest third: 72%; Middle third: 73%; Lowest

309   third: 87%; Figure 1c) but not tutor groups K-T ($P = 0.419$; Highest third: 62%; Middle third:

310   59%; Lowest third: 70%; Figure 1d). This difference appears to be the result of higher

311   progression rates in the intervention group (i.e., the lowest third of tutor groups A-J) compared

312   with the non-intervention group (i.e., the lowest third of tutor groups K-T) ($P = 0.027$;

313   Intervention: 87%; Non-intervention: 70%; Figure 1b).

314   The number of students that withdrew from the degree programme before the end of the

315   academic year was not different between tertiles (P = 0.490; Highest third: 7 students; Middle

316   third: 13 students; Lowest third: 7 students). There was also no difference between tertiles in

317   the number of withdrawals for tutor groups A-J (P = 0.610) or K-T (P = 0.381), or between

318   intervention and non-intervention groups (P = 0.697).

319   *Mean grade*

320   One-way ANOVA revealed no significant difference in mean grade between tertiles when

321   assessed as an entire cohort (P = 0.129; Figure 2a). Alternatively, mean grade was significantly

322   different between tertiles for tutor groups A-J (P = 0.032), with post-hoc analysis demonstrating

323   significantly higher grades in the lowest third compared with the highest third (P = 0.010) and

324   a trend for higher grades in the lowest third compared with the middle third (P = 0.087) (Figure

325   2c). There was no difference between tertiles for tutor groups K-T (P = 0.678; Figure 2d). These

326   contrasting findings appear to be the result of higher mean grades in the intervention group

327   compared with the non-intervention group (P = 0.026; Figure 2b).

328   *Attendance*

329   One-way ANOVA revealed no significant difference in attendance between tertiles when

330   assessed as an entire cohort (P = 0.375; Figure 3a), tutor groups A-J (P = 0.490; Figure 3c) or

331   tutor groups K-T (P = 0.885; Figure 3d). Attendance was significantly higher in the intervention

332   group than the non-intervention group (P = 0.007; Figure 3b).

333   *VLE access*

334   One-way ANOVA revealed no significant difference in the frequency of VLE access between

335   tertiles when assessed as an entire cohort (P = 0.652; Figure 4a), tutor groups A-J (P = 0.935;

336   Figure 4c) or tutor groups K-T (P = 0.500; Figure 4d). There was a trend towards a higher

337 frequency of VLE access in the intervention group compared with the non-intervention group

338 (P = 0.059; Figure 4b).

339

340 **Discussion**

341 Higher education institutions typically rely on personal tutoring programmes to provide both

342 academic and pastoral support to students. However, there is a need to adopt additional

343 strategies to support students during their transition to a university learning environment and

344 to retain students in accordance with the UK performance indicators of HE (HESA 2016;

345 Pollard et al. 2013). Although recent research has used EI screening as a tool to identify

346 students that may require additional support during the transition to university (Philippi,

347 Kristensen, and Taylor 2012; Qualter et al. 2009), the present study did not observe any

348 association between EI scores and academic performance or progression rates in a cohort of

349 first year undergraduate students. However, this study did demonstrate improved outcomes for

350 a subsection of the participants that received a targeted text messaging support intervention.

351 In addition to investigating the effects of a supportive text messaging intervention, the present

352 study design enabled further exploration of the relationship between EI and progression rates,

353 achieved mean grade, attendance and VLE access in first year undergraduate students. This

354 was achieved through the use of a control group for students within the lowest third of total EI

355 scores who were in tutor groups K-T. Subsequently, the lack of any intervention for the 168

356 students in tutor groups K-T across all EI tertiles provided the opportunity to investigate these

357 relationships without any contamination from experimental interventions. Our findings

358 demonstrated that progression rates, achieved mean grade, attendance and VLE access did not

359 significantly differ across the three tertiles of EI. These results do not appear to support the

360 notion suggested by others that higher emotional intelligence is associated with greater

361   likelihood to progress (Parker et al. 2006; Qualter et al. 2009), higher academic attainment

362   (Parker et al. 2004, 2005; Pope, Roper, and Qualter 2012) and greater engagement with

363   learning (Arguedas, Daradoumis, and Xhafa 2016). One potential explanation for such

364   conflicting results is the method of data analysis performed within the studies. In this regard,

365   positive associations between EI and academic outcomes have typically been observed via

366   retrospective analysis of EI scores after the participants have been separated into categories of

367   academic achievement or progression at the end of the monitoring period (Parker et al. 2004,

368   2005, 2006; Pope, Roper, and Qualter 2012; Qualter et al. 2009). In contrast, the purpose of

369   the present study was to evaluate the effectiveness of EI screening as a *prospective* measure to

370   identify students that might benefit from additional support during their first year at university.

371   The categorisation of participants into tertiles based on total EI scores follows a similar

372   approach to Qualter et al. (2009) who also failed to observe a relationship between EI and

373   progression rates when participants were prospectively categorised.

374   A particularly novel aspect of the present study was the targeted provision of a text messaging

375   intervention to raise students' awareness of university support services at key time points

376   during the academic year. Although the present study may be regarded as a pilot intervention,

377   the initial results are encouraging. In this regard, compared with a matched control group, the

378   students receiving the intervention demonstrated significantly higher progression rates, higher

379   mean grades, higher attendance, and a trend towards greater VLE access. These seemingly

380   beneficial effects occurred despite the absence of any responses from the intervention group to

381   seek appointments with the Student Liaison Officer after receiving the text messages. The

382   reasons for students not responding to the offered support are unknown but their reluctance to

383   engage with support services corresponds with previous literature. In this regard, university

384   students have shown significant heterogeneity in their support seeking behaviours, with

385   students commonly not seeking help for academic (Ryan et al. 1998), counselling (Morgan et

386   al. 2003) career guidance (Graef et al. 2010), and mental health support (Eisenberg et al. 2007)

387   even when the help is available and required. Findings specifically from UK universities

388   highlight that many students do not seek support even when experiencing a problem (Christie

389   et al. 2004), which is particularly concerning based on data from more than 450 campus-based

390   and open university students that all students within this sample reported some difficulty when

391   entering HE (Gutteridge 2001). In the present study we attempted to reduce the barriers to

392   support seeking by directly reminding students of the support available within the university.

393   Further investigation of the reasons underlying the lack of help seeking behaviours was beyond

394   the scope of this study but represents an important avenue for future research to establish how

395   to develop future support mechanisms that are most appropriate for the student population.

396   Although the text messaging intervention did not promote help seeking behaviours from the

397   students, it seems feasible that the receipt of the text messages alone may have benefitted the

398   students. This effect is supported by previous evidence that a text messaging intervention

399   increased participant perceptions of support and persistence with new behaviours in a physical

400   activity setting (Kinnafick, Thøgersen-Ntoumani, and Duda 2016). Furthermore, in a sports

401   performance context the mere perception of support has been shown to evoke an increased

402   sense of confidence and reassurance coupled with a reduction in stress and anxiety (Freeman

403   and Rees 2010). These findings suggest that an increased perception of support may have been

404   gained from the text messaging intervention to help students cope and persist with the demands

405   of an unfamiliar HE environment. The observed improvements in progression rates may be

406   particularly relevant for HE institutions in the UK considering the increased focus on student

407   retention as a key marker of success for universities and the need for high retention rates to

408   fulfil financial aims via the income generated from tuition fees (Bennett, Kottasz, and

409   Nocciolino 2007; Owen 2002; Simpson 2005). Retention is also important to maximise the

410   prospects of enrolled students based on evidence that compared with non-graduates, university

411   graduates lead healthier lifestyles (Baum, Ma, and Payea 2013) and experience better outcomes

412   in both lifetime earnings and employability (Day and Newburger 2002; Universities UK 2014).

413   However, further research is required to substantiate the findings of the present study and to

414   assess student perceptions of support in response to this form of intervention.

415   The findings from the present study provide a number of implications and future directions for

416   both research and practice that require consideration. First, considering the novelty of the text

417   messaging intervention within this context, it is crucial that further research is performed to

418   investigate similar time- and cost-effective interventions to improve student outcomes in a

419   larger sample of students and across a range of institutions. It must also be acknowledged that

420   EI is considered to be a dynamic construct with the potential to fluctuate over the course of a

421   student's experiences within HE (Parker et al. 2004). Subsequently, the findings of the present

422   study may be limited by the assessment of EI at a single baseline time point and future research

423   may benefit from the longitudinal assessment of EI and its association with relevant outcomes

424   throughout university degree programmes. Second, future research should also consider the

425   most appropriate outcomes to assess as a measure of student engagement. Although the present

426   study used the most appropriate proxy measurements for student engagement (attendance and

427   VLE access), a more targeted and comprehensive investigation is required in future research

428   to examine the qualitative aspects of this concept (Kuh 2009). Third, EI was assessed in the

429   present study using a validated and reliable EI questionnaire (Parker et al. 2011) in order to

430   screen a large cohort of students with limited resources. This method successfully differentiated

431   the EI of students and provided further insights into the relationship between EI and student

432   success outcomes, as well as enabling our investigation into the effects of a text messaging

433   intervention for those students with the lowest EI scores on entry to university. The quantitative

434   findings gained from the present study provide important insights into the potential utility of

435   prospective EI screening as a predictor of student success. These findings have also

436   demonstrated the potential benefits of supportive text messaging to improve student outcomes.

437   It would be beneficial for future research to develop these findings through the addition of

438   qualitative data to better understand optimal support interventions and for the development of

439   other novel or adapted approaches to support the diverse needs of university students.

440   An additional fundamental consideration in relation to the present study is that the definition

441   of academic success and achievement remains a debated topic and we did not assess all aspects

442   of this concept. In this regard, a recent review has suggested that additional aspects beyond

443   those assessed in the present study should be considered when measuring academic

444   achievement (York et al. 2015). This includes distinctly assessing the attainment of learning

445   objectives and the acquisition of desired skills and competencies of students during their degree

446   programme as a marker of learning rather than focussing solely on performance ability. Student

447   satisfaction has also been considered as an outcome for student success based on the

448   acknowledged relationship between student wellbeing and academic performance (Beghetto

449   2004; York et al. 2015), and ultimately the post-college performance of students should be

450   integrated within measures of academic success (York et al. 2015). Subsequently, although the

451   present study measured the most commonly used markers of academic success, it must be

452   acknowledged that this provided relatively narrow criteria for academic success and it would

453   be beneficial for future research to evaluate the effectiveness of support interventions on

454   student success when measured more holistically.

455   Despite these limitations, we can state with confidence that the participants did not respond

456   adversely to the intervention performed in the present study and the observed positive effects

457   associated with such a low-cost initiative suggests that staff within HE environments may be

458   in a position to harness novel time- and cost-effective support mechanisms to benefit student

459   outcomes. It must also be considered that this approach could be used in conjunction with,

460   rather than as a replacement for, peer-mentoring schemes if these are already established within

461 institutions. Such use of multiple student support initiatives may be beneficial considering that

462 peer-support networks have been advocated as a useful intervention for students in HE but that

463 an optimal approach has not yet been established (Crisp and Cruz 2009).

464 In conclusion, this study did not identify any benefits of EI screening as a prospective indicator

465 of student success but provides encouraging indications that a text messaging support

466 intervention could help to improve attendance, mean grades and progression rates in first year

467 undergraduate students. Considering the novel nature of the intervention within this context,

468 these conclusions should be viewed as tentative, with further research warranted before they

469 are used as the basis for interventions being developed and implemented with student cohorts

470 on a wider scale. The authors of the present study recommend that colleagues at other

471 institutions consider opportunities for conducting additional studies that employ more

472 prolonged and intensive investigations to further investigate these proof-of-concept findings.

473

479 **Conflict of interest**

480 The authors declare that there are no conflicts of interest.

481 **References**

482 Arguedas, M., T. Daradoumis, and F. Xhafa. 2016. "Analyzing How Emotion Awareness

483 Influences Students' Motivation, Engagement, Self-Regulation and Learning Outcome."

484 *Educational Technology & Society* 19 (2): 87–103.

485 Bar-On, R. 2002. *Bar-On Emotional Quotient Inventory: Short (EQ-i:S): Technical Manual.*

486 Toronto, ON, Canada: Multi-Health Systems.

487 Bar-On, R. 2006. "The Bar-On Model of Emotional-Social Intelligence (ESI)." *Psicothema*

488 18: 13-25.

489 Baum, S., J. Ma, and K. Payea. 2013. *Education Pays 2013: The Benefits of Higher*

490 *Education for Individuals and Society*.

491 http://trends.collegeboard.org/sites/default/files/education-pays-2013-full-report.pdf.

492 Beghetto, R. A. 2004. "Toward a More Complete Picture of Student Learning: Assessing

493 Students' Motivational Beliefs." *Practical Assessment, Research & Evaluation* 9 (15): 1-5.

494 Bennett, R., R. Kottasz, and J. Nocciolino. 2007. "Catching the Early Walker: An

495 Examination of Potential Antecedents of Rapid Student Exit from Business-Related

496 Undergraduate Degree Programmes in a Post-1992 University." *Journal of Further and*

497 *Higher Education* 31 (2): 109–32.

498 Briggs, A. R. J., J. Clark, and I. Hall. 2012. "Building Bridges: Understanding Student

499 Transition to University." *Quality in Higher Education* 18 (1): 3-21.

500   Cartney, P., and A. Rouse. 2006. "The Emotional Impact of Learning in Small Groups:

501   Highlighting the Impact on Student Progression and Retention." *Teaching in Higher*

502   *Education* 11 (1): 79-91.

503   Christie, H., M. Munro, and T. Fisher. 2004. "Leaving University Early: Exploring the

504   Differences Between Continuing and Non-Continuing Students." *Studies in Higher*

505   *Education* 29 (5): 617-36.

506   Christo, Z, and A. Oyinlade. 2015. "Factors of Student Attrition at an Urban University."

507   *International Journal of Humanities and Social Science* 5 (9): 1.

508   Crawford, C. 2014. "Socio-Economic Differences in University Outcomes in the UK: Drop-

509   Out, Degree Completion and Degree Class." *Institute for Fiscal Studies*, DOI

510   10.1920/wp.ifs.2014.1431.

511   Crisp, G., and I. Cruz. 2009. "Mentoring College Students: A Critical Review of the

512   Literature between 1990 and 2007." *Research in Higher Education* 50 (6): 525–45.

513   Crozier, G., D. Reay, J. Clayton, L. Colliander, and J. Grinstead. 2008. " Different strokes for

514   different folks: diverse students in diverse institutions – experiences of higher education."

515   *Research Papers in Education* 23 (2): 167-77.

516   Day, J. C., and E. C. Newburger. 2002. *The Big Payoff: Educational Attainment and*

517   *Synthetic Estimates of Work-Life Earnings*. http://www.census.gov/prod/2002pubs/p23-

518   210.pdf.

519   Edwards, D., and J. McMillan. 2015. "Completing University in a Growing Sector: Is Equity

520   an Issue?" Retrieved from:

521 http://research.acer.edu.au/cgi/viewcontent.cgi?article=1045&context=higher_education

522 (accessed 19.07.17).

523 Eisenberg, D., E. Golberstein, and S. E. Gollust. 2007. "Help-Seeking and Access to Mental

524 Health Care in a University Student Population." *Medical Care* 45 (7): 594-601.

525 Freeman, P., and T. Rees. 2010. "Perceived Social Support from Team-Mates: Direct and

526 Stress-Buffering Effects on Self-Confidence." *European Journal of Sport Science* 10 (1): 59–

527 67.

528 Graef, S. T., D. M. Tokar, and K. P. Kaut. 2010. "Relations of Masculinity Ideology,

529 Conformity to Masculine Role Norms, and Masculine Gender Role Conflict to Men's

530 Attitudes Toward and Willingness to Seek Career Counseling." *Psychology of Men &*

531 *Masculinity* 11 (4): 319-33.

532 Gutteridge, R. 2001. "Student Support, Guidance and Retention; Re-Defining Additional

533 Needs." Retrived from: http://www.leeds.ac.uk/educol/documents/00001709.htm (accessed

534 19.07.17).

535 Haggis, T. 2004. "Meaning, Identity and 'Motivation': Expanding What Matters in

536 Understanding Learning in Higher Education?" *Studies in Higher Education* 29 (3): 335-52.

537 Harper, Shaun R., and Stephen J. Quaye. 2014. "Making Engagement Equitable for Students

538 in U.S. Higher Education." In *Student Engagement in Higher Education: Theoetical*

539 *Perspectives and Practical Approaches for Diverse Populations*, edited by Stephen J. Quaye

540 and Shaun R. Harper, 1-15. Abingdon: Routledge.

541 HESA. 1996. *Higher Education Statistics for the United Kingdom 1996/97.*

542 *https://www.hesa.ac.uk/data-and-analysis/students/overviews?keyword=All&year=547.*

543   HESA. 2016. *Summary - UK Performance Indicators 2014/15. https://www.hesa.ac.uk/data-*

544   *and-analysis/performance-indicators/summary.*

545   HESA. 2017. *Higher education student enrolments and qualifications obtained at higher*

546   *education providers in the United Kingdom 2015/16. https://www.hesa.ac.uk/news/12-01-*

547   *2017/sfr242-student-enrolments-and-qualifications.*

548   Keefer, K. V., J. D. A. Parker, and L. M. Wood. 2012. " Trait Emotional Intelligence and

549   University Graduation Outcomes: Using Latent Profile Analysis to Identify Students at Risk

550   for Degree Noncompletion." *Journal of Psychoeducational Assessment* 30 (4): 402-13.

551   Kinnafick, F. E., C. Thøgersen-Ntoumani, and J. Duda. 2016. "The Effect of Need

552   Supportive Text Messages on Motivation and Physical Activity Behaviour." *Journal of*

553   *Behavioral Medicine* 39 (4): 574–86.

554   Kuh, G. D. 2009. "What Student Affairs Professionals Need to Know about Student

555   Engagement." *Journal of College Student Development* 50 (6): 683–706.

556   Kuh, G. D., J. Kinzie, J. A. Buckley, B. K. Bridges, and J. C. Hayek. 2006. "What Matters to

557   Student Success: A Review of the Literature." Retreived from:

558   https://nces.ed.gov/npec/pdf/kuh_team_report.pdf (accessed 19.07.17).

559   Locke, E. A. 2005. "Why Emotional Intelligence is an Invalid Concept." *Journal of*

560   *Organizational Behaviour* 26 (4): 425-31.

561   Lockhart, P. 2004. "An Investigation into the Causes of Student Drop Out Behaviour."

562   Retrieved from: http://www.psy.gla.ac.uk/~steve/localed/docs/lockhart.pdf (accessed

563   19.07.17).

564   Mayer, J. D., P. Salovey, and D. R. Caruso. 2008. "Emotional Intelligence: New Ability or

565   Eclectic Traits?" *American Psychologist* 63 (6): 503-17.

566   Morgan, T., D. Ness, and M. Robinson. 2003. "Students' Help-Seeking Behaviours by

567   Gender, Racial Background, and Student Status." *Canadian Journal of Counselling* 37 (2):

568   151–66.

569   Owen, M. 2002. "'Sometimes You Feel You're in Niche Time': The Personal Tutor System,

570   a Case Study." *Active Learning in Higher Education* 3 (1): 7–23.

571   Parker, J. D. A., J. M. Duffy, L. M. Wood, B. J. Bond, and M. J. Hogan. 2005. "Academic

572   Achievement and Emotional Intelligence: Predicting the Successful Transition from High

573   School to University." *Journal of The First-Year Experience* 17 (1): 67–78.

574   Parker, J. D. A., M. J. Hogan, J. M. Eastabrook, A. Oke, and L. M. Wood. 2006. "Emotional

575   Intelligence and Student Retention: Predicting the Successful Transition from High School to

576   University." *Personality and Individual Differences* 41 (7): 1329–36.

577   Parker, J. D. A., K. V. Keefer, and L. M. Wood. 2011. "Toward a Brief Multidimensional

578   Assessment of Emotional Intelligence: Psychometric Properties of the Emotional Quotient

579   Inventory-Short Form." *Psychological Assessment* 23 (3): 762–77.

580   Parker, J. D. A., L. J. Summerfeldt, M. J. Hogan, and S. A. Majeski. 2004. "Emotional

581   Intelligence and Academic Success: Examining the Transition from High School to

582   University." *Personality and Individual Differences* 36 (1): 163–72.

583   Petrides, K. V., R. Pita, and F. Kokkinaki. 2007. "The Location of Trait Emotional

584   Intelligence in Personality Factor Space." *British Journal of Psychology* 98 (2): 273-89.

585 Philippi, W. A., H. A. Kristensen, and R. N. Taylor. 2012. "Students at Risk for Dropping

586 Out : Multi-Year Results of Two Student Mentoring Programs," Trent University.

587 Pollard, E., M. Williams, J. Williams, C. Bertram, and J. Buzzeo. 2013. *How Should We*

588 *Measure Higher Education? A Fundamental Review of the Performance Indicators. Part*

589 *Two: The Evidence Report.*

590 http://www.hefce.ac.uk/media/hefce/content/pubs/indirreports/2013/Fundamental,review,of,t

591 he,UKPIs/2013_ukpireview2.pdf.

592 Pope, D., C. Roper, and P. Qualter. 2012. "The Influence of Emotional Intelligence on

593 Academic Progress and Achievement in UK University Students." *Assessment & Evaluation*

594 *in Higher Education* 37 (8): 907–18.

595 Qualter, P., H. Whiteley, A. Morley, and H. Dudiak. 2009. "The Role of Emotional

596 Intelligence in the Decision to Persist with Academic Studies in HE." *Research in Post-*

597 *Compulsory Education* 14 (3): 219–31.

598 Richardson, M., C. Abraham, and R. Bond. 2012. " Psychological Correlates of University

599 Students' Academic Performance: A Systematic Review and Meta-Analysis." *Psychological*

600 *Bulletin* 138 (2): 353-87.

601 Ryan, A. M., M. H. Gheen, and C. Midgley. 1998. "Why do Some Students Avoid Asking for

602 Help? An Examination of the Interplay Among Students' Academic Efficacy, Teachers'

603 Social-Emotional Role, and the Classroom Goal Structure." *Journal of Educational*

604 *Psychology* 90 (3): 528–35.

605   Schneider, M. 2010. "Finishing the First Lap: The Cost of First Year Student Attrition in

606   America's Four Year Colleges and Universities." *American Institutes for Research.*

607   http://www.air.org/sites/default/files/AIR_Schneider_Finishing_the_First_Lap_Oct101.pdf.

608   Simpson, O. 2005. "The Costs and Benefits of Student Retention for Students, Institutions

609   and Governments." *Studies in Learning, Evaluation Innovation and Development* 2 (3): 34–

610   43.

611   Thomas, L. 2012. *Building Student Engagement and Belonging in Higher Education at a*

612   *Time of Change: Final Report from the What Works? Student Retention & Success*

613   *Programme*. https://www.heacademy.ac.uk/system/files/what_works_final_report_0.pdf.

614   Trotter, E, and C. A. Roberts. 2006. "Enhancing the Early Student Experience." *Higher*

615   *Education Research & Development* 25 (4): 371–86.

616   Trowler, V. 2010. *Student Engagement Literature Review*.

617   https://www.heacademy.ac.uk/system/files/studentengagementliteraturereview_1.pdf.

618   Universities UK. 2014. *Patterns and Trends in UK Higher Education*.

619   http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2014/patterns-and-

620   trends-in-uk-higher-education-2014.pdf.

621   Wilcox, P., S. Winn, and M. Fyvie-Gauld. 2005. "It was Nothing to do with the University, it

622   was just the People': The Role of Social Support in the First-Year Experience of Higher

623   Education." *Studies in Higher Education* 30 (6): 707-22.

624   York, T. T., C. Gibson, and S. Rankin. 2015. "Defining and Measuring Academic Success."

625   *Practical Assessment, Research & Evaluation* 20 (5): 1-20.

626 **Table 1.** Scores for each subscale of the EQ-i:S in each tertile.

	Highest third	Middle third	Lowest third	P
Interpersonal skills	41 (3)	40 (3)	38 (4)	<0.0005
Intrapersonal skills	27 (5)	23 (4)	19 (4)	<0.0005
Stress management	28 (5)	24 (4)	22 (3)	<0.0005
Adaptability	27 (4)	26 (3)	24 (4)	<0.0005

627
628 Values are mean (SD). P-values were determined using one-way ANOVA.

629

630

631

632

633   **Figure 1.** Progression rates from the first to second year of study for the entire cohort (a), the

634   intervention and non-intervention groups (b), tutor groups A-J (c) and tutor groups K-T (d).

635   Black bars represent the number of progressing students and the white bars represent the

636   number of non-progressing students. *Significantly different between intervention and non-

637   intervention groups.

638   **Figure 2.** Mean grade achieved during the first year of study for the entire cohort (a), the

639   intervention and non-intervention groups (b), tutor groups A-J (c) and tutor groups K-T (d).

640   *Significantly different between intervention and non-intervention groups. [#]Significantly

641   higher in the lowest third than the highest third. Values are mean (SD).

642   **Figure 3.** Seminar attendance within the IRSS module for the entire cohort (a), the intervention

643   and non-intervention groups (b), tutor groups A-J (c) and tutor groups K-T (d). *Significantly

644   different between intervention and non-intervention groups. Values are mean (SD).

645   **Figure 4.** VLE access within the IRSS module for the entire cohort (a), the intervention and

646   non-intervention groups (b), tutor groups A-J (c) and tutor groups K-T (d). Values are mean
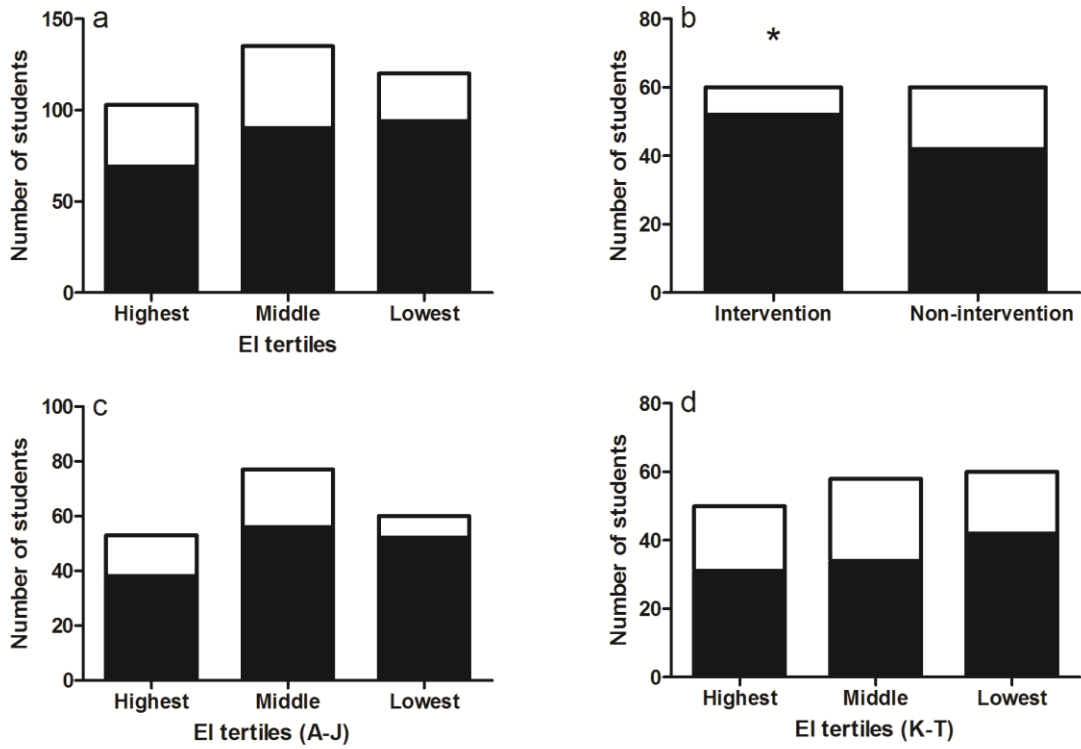
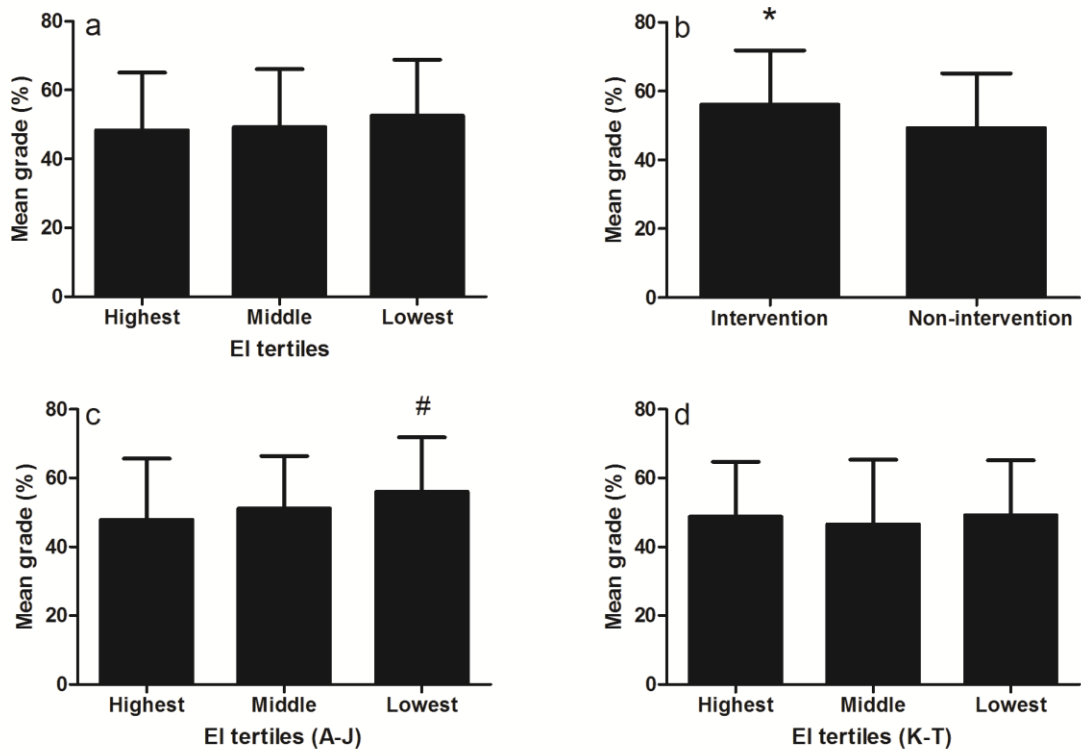647   (SD).

648

649

650

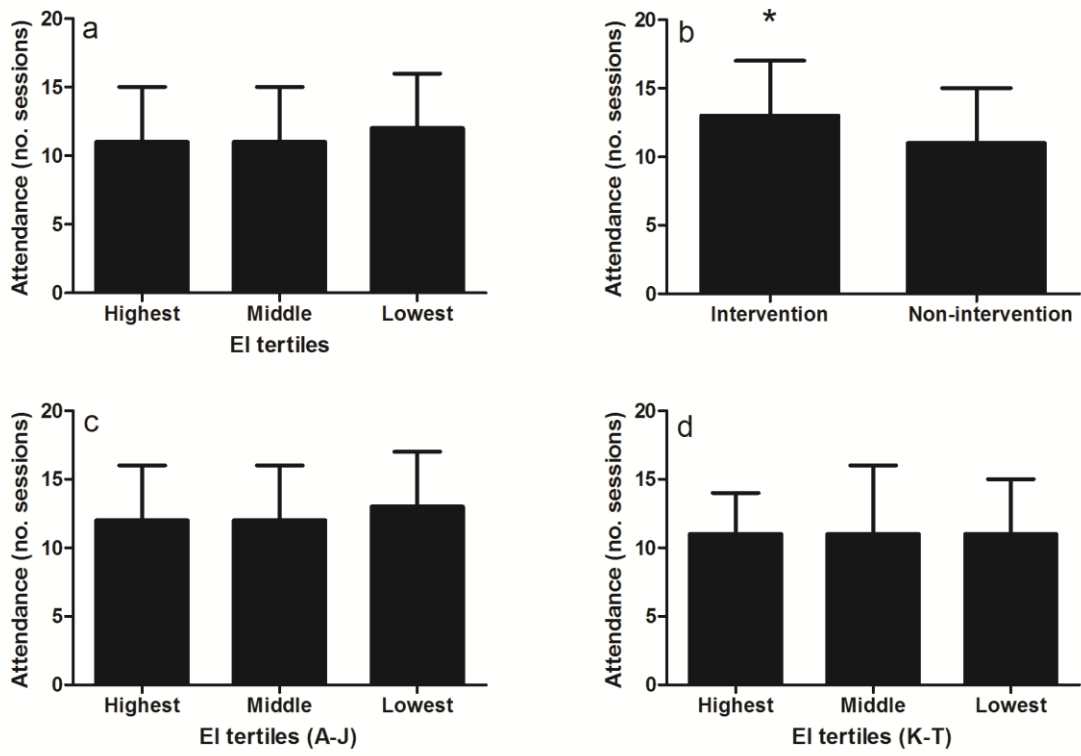651

652   **Figure 1**

653

654

655   **Figure 2**

656

657

658   **Figure 3**

659

660

661 **Figure 4**

662