

## Article

# What makes a happy team? Data from 5 years' entrepreneurship teaching suggests that working style is a major determinant of team contentment

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## ABSTRACT

I report on five years' testing of what makes a happy team, using students in a Bioscience Entrepreneurship Masters programme at Cambridge University as a test-bed. I looked at measures of personality (using the IPIP test for the Big Five personality characteristics) and a measure of work style derived from the time of submission of work that I term Deadline Brinkmanship. I find that teams selected to have a similar working style are generally happier working together than those selected by other criteria. Entrepreneurial activity is not significantly correlated with psychological characteristics in this study, but is slightly correlated with working style and the willingness to accept a "good enough" result now rather than an ideal result in the future. I suggest that it may be useful for a nascent entrepreneurial team to work together on an important, deadline-driven task before committing to a new venture to test for work style compatibility.

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Keywords: founding team; startup; personality; Big five; work style

## INTRODUCTION

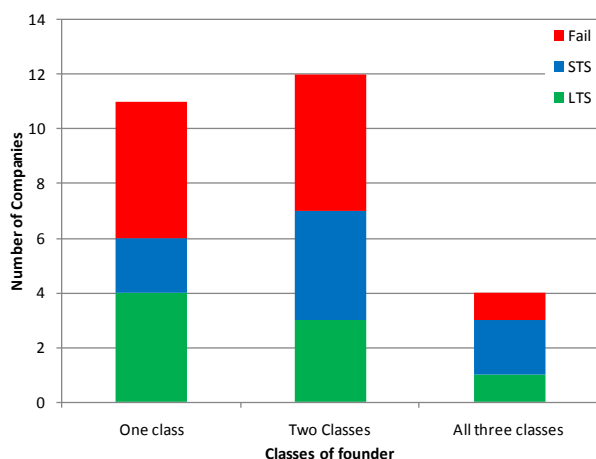
**W**HAT MAKES A good, a happy, or a successful entrepreneurial team? Many of us wish we knew, both for our own use and for educating others. Despite the media focus on the heroic lone entrepreneur, almost all businesses are actually created by teams,<sup>1</sup> and identifying how to build successful teams is therefore of substantial importance to business literature and economic policy. There is a wide range of

research and advice on how to build the team for a new venture<sup>2–8</sup> and on team motivation.<sup>9–12</sup> Clearly, a start-up management team needs a range of skills and capabilities to manage, grow, finance and exit their company.<sup>3,4,13</sup> A diverse experience is usually helpful<sup>14</sup>, and specific skills are essential, although prior track record of success, while always cited as a leading factor in attracting investment, is not actually that valuable a predictor of future success.<sup>5,15,16</sup> The standard investor mantra is that a good, investable management team covers the key skills needed to grow and exit the business. There is actually strong evidence that venture investors do not invest in such teams, but rather invest in teams that have previously shown they can create a successful business, and then replace them<sup>17, 18</sup>. However these managing teams do not necessarily represent *founding* teams.

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As Nelson says, “Every firm exists because some founding person or group of persons made the decision to establish a firm and then acted on that decision.”<sup>19</sup> The terms new venture team, founding team, and entrepreneurial team are often used nearly interchangeably for those founding persons. However the demands on what Forster called the ‘Founding Partnership’, the group of people who come together to define and create a new enterprise,<sup>20</sup> are quite different from those on the team that then builds and runs the enterprise. The founding team rarely has all the skills that management theory and investor rhetoric says are needed for management of a start-up, but this is not a predictor of future failure (see Figure 1). Rather, the founding team is characterised by the willingness and ability to work together for a long



**Figure 1:** Skill set completeness in UK biotechnology companies

The founding teams of 27 UK biotechnology companies, founded between 2005 and 2012, were categorized on whether each member brought science/technology, business/marketing/selling, or financial skills to the company. A founding member could bring more than one skill set. X axis: number of these classes represented in the founding team. Y axis: number of company founding teams. Companies are classified as Long Term Successful (LTS) if they had raised several rounds of finance, achieved break-even in sales or exited, Short Term Successful (STS) if they had achieved their immediate business goals (usually raise one round of finance or close one major deal), or Failed (Fail) if they did not raise any finance or complete any initial sales or deals. Note that, of the 16 “successful” companies, 6 no longer existed as independent entities in Jan 2014 and had lost their initial (seed or Series A) investors some or all of their invested money. There is no statistical difference between the one, two and three-function teams (Chi squared statistic for testing the null hypothesis that LTS, STS and Fail are not significantly different between one-two- and three-class sets = 1.69 – critical value for  $p=0.05$  for 4 degrees of freedom = 9.49, null hypothesis not rejected.)

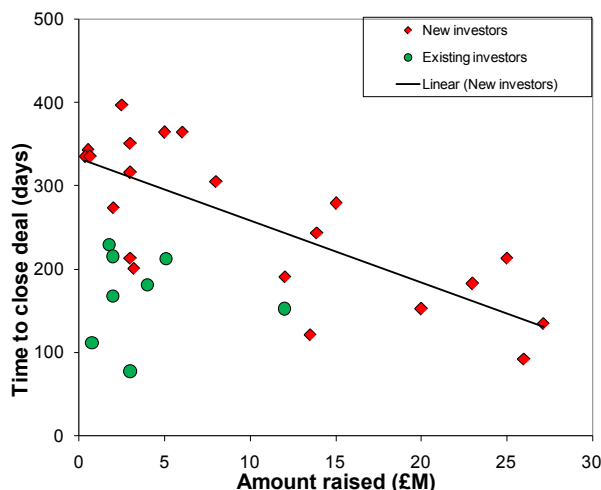
time to develop the new business idea until it is ready to receive the skilled management it will ultimately require.

The Founding Partnership needs to define the business they are going to build, a process that involves many iterations of planning preliminary business ideas (that usually turn out to be unworkable) in order to reach a potentially workable and convincing business plan.<sup>21</sup> The ability to do this successfully is a Dynamic Capability in the terminology of Resource Based Valuation<sup>22</sup>. Dynamic Capabilities are defined as

*“the firm’s processes that use resources — specifically the processes to integrate, reconfigure, gain and release resources — to match and even create market change. Dynamic capabilities this are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die.”*<sup>22</sup>

The start-up is the search for a business model, not the operation of a business plan,<sup>23,24</sup> and because that model is not defined, the Dynamic Capabilities necessary at start-up, when there is no established firm, are functions of team dynamics, not business processes.<sup>25,26</sup> Thus the core of the value of a start-up is embedded in how the Founding Partnership work together. The start-up venture operates as if it were in a highly volatile market (a “high velocity environment”<sup>27</sup>), even if its actual market is a well-established one, because for the start-up what they are going to do next is not defined. In such an environment, flexibility and close working together are the key Capabilities, as opposed to detailed operational procedures in more established businesses. Thus team efficiency is key not only to team happiness but to success.

This deep working connection must be sustained.<sup>23-25</sup> A key early action for the Founding Partnership is raising money, which takes substantial time — the amount of time spent *failing* to gain investment is obviously hard to define, but can run to years. For a small, first time investee company that is *successful* in raising investment, the average time in UK biotechnology successfully to close the investment deal *after* they have produced an “investment-ready” business plan is around 9 months (Figure 2). During this time the Founding Partnership must work hard together, for free. This aspect of founding a new enterprise is usually skated over in case histories, which focus on initiating events and the business opportunity and not the long, hard slog to get from one to the other (for examples of such narratives, see refs<sup>28,29</sup>). During this time, the team must be happy to work together and trust each other: trust is a key determinant of success in early start-ups<sup>30</sup>.



**Figure 2:** Time needed to raise investment  
*Time from sending out an investment ready business plan to agreeing Heads of Terms on an investment in that plan, for UK biotechnology companies. Data gathered by the author from confidential discussions with 32 UK biotech companies 2005 – 2010. “New Investor” – investment in a round where at least 1/3 of the shares were acquired by an investor not an existing shareholder in the investee company. ‘Existing investor’ – investment in a round where >2/3 of the shareholders were already shareholders in the company. Solid line – least squares best fit to “New Investors” data points.*

What triggers the entrepreneurial journey is need, ambition, and that poorly defined thing “entrepreneurship”. But what makes them keep on doing it, and not go back to the “day job”? In ten years’ teaching on the University of Cambridge Masters in Bioscience Enterprise (MBE) programme,<sup>i</sup> I have been involved in discussions with over 250 students about founding teams’ history and characteristics. In theory the entrepreneur is ambitious, confident, risk-averse, extrovert, and completely focussed on commercial success.<sup>30</sup> Class studies, visiting speakers and site visits have provided a wide range of examples of the entrepreneurial journey. The founders’ personal experiences vary from the classic view summarised above to successful founders who apparently fitted none of the standard models of a new venture team. Intrigued by this, I have probed the question of what features of a Founding Partnership might enable them to work together during that pre-incorporation stage of the entrepreneurial journey, i.e. what makes them a happy team even if they are not ultimately a successful one. I have also made some limited observations on their entrepreneurial propensities as well. I hope in a decade to be able to provide a retrospective report on what

i <http://www.ceb.cam.ac.uk/pages/masters-in-bioscience-enterprise-programme.html>

characteristics subsequently lead the study participants to entrepreneurial success<sup>ii</sup>.

## METHODS

### THE STUDENT GROUP

The majority of the results below are from students of the MBE course from years 2008/9 thru 2012/13, with some additional data on personality and entrepreneurship from 2013/14. Average student age was 25.7 years (Standard deviation 3.86 years) for the 137 men, 26.2 years (SD=6.09) for the 116 women. The students came from 33 different countries, with UK (59 students), non-UK EU countries (35 students), USA (38 students), India (20 students), and China (11 students) the most highly represented regions. The module in which these tests were done was run during the autumn term (October through December), and concerned start-up company creation and finance. The various exercises therefore supported teaching goals on team formation in this module. The students interact very intensely from the start of the course, contributing to “workplace” socialization,<sup>31,32</sup> as a result none of the team members were ‘newbies’ or ‘outsiders’ when these studies were conducted.

### THE NON-STUDENT GROUP

As an ‘outgroup’ for the personality tests, I also e-mailed the test form to ~100 non-students involved in the Cambridge area biotechnology cluster, and received 37 responses. A summary of this group is provided in Table 1.

### GROUP PREFERENCES AND PERSONALITY PROFILES

Group preferences were collected by written, anonymous comments at the end of the course, as described below. ‘Big Five’ personality characteristics were constructed from a 100-question International Personality Item Pool (IPIP) questionnaire originally developed by Prof. Tom Buchanan at the University of Westminster, UK ([www.buchanan.org.uk](http://www.buchanan.org.uk)). The questionnaire was administered at the start of the term to students and by e-mail in March 2009 to non-student volunteers.

ii If I can define success, and am still alive.

**Table 1:** Non-student participants in the IPIP personality survey

Type of participant	Number	
	Male	Female
Scientist / technologist	5	1
SME Exec	3	0
Consultant / professional services (SME/sole trader)	5	3
Consultant / professional services (large company)	3	2
Biz dev exec (including TTO)	2	1
Own start-up (other than professional services)	5	1
VC/finance	6	0

## PERSONAL DATA AND PERMISSIONS

Data has been collected from students on the University of Cambridge *Masters in Bioscience Enterprise* programme and by questionnaires sent to ex-students and to Cambridge area professionals. Test subjects were asked to fill in the forms in person or by e-mail. It was made clear to all of the student participants that the exercises were not linked in any way to course assessment. A small fraction of the students chose not to fill in the questionnaires, or were not present when questionnaires were administered, or failed to follow the instructions and so produced invalid responses. Feedback on the scores and analysis were provided back to the individual only, and not made available to anyone else (with the exception of the author's test scores, which he is happy to share).

Group assignments (see *The Big Five personality traits*, below) were done according to the study design, unless a student had a strong objection to working with another student, in which case their wishes were respected. Across the course students were assigned to groups in such a way that every student worked with as many fellow students as possible, so the studies reported here did not affect their degree experience or outcome.

## ENTREPRENEURSHIP

A criterion of acceptance into the MBE course is that students show evidence that they have been 'entrepreneurial' in some sense. I therefore defined 'entrepreneurial' activities very narrowly as any activity where the individual was a founding member of a new enterprise (whether for-profit or non-profit) that was set up outside

their current institution (whether school, university or employment), set up without substantial *prior* commitment of resources by others (such as grants or investment), and with substantial investment of time or other resources on the founders' part. Examples of 'entrepreneurial' activities include setting up a new company, setting up a new charity, launching an independent publication. Examples of non-entrepreneurial activity (under this restrictive definition) are heading the formation of a new group within a company, leading a university organization, or organizing a student expedition. By adopting this restricted definition I avoided the requirement to make value judgements about the level of risk, initiative and personal investment needed in a wide range of disparate activities from students from many countries.

This definition does not take into account whether the entrepreneurial activity was a success. The point of this study was to analyse founding partnerships, and not the many factors (most of which are out of the control of the founding team) that can affect outcome.

## OTHER DATA

Other data have been collected by the author over the last 10 years from interviews with biotechnology companies and their founders, primarily in the UK.

## DATA AVAILABILITY

The IPIP questionnaire, calculation spreadsheet and summary personality data from which this paper was derived can be downloaded as an Excel spreadsheet from [www.rufus-scientific.com/grouppersonality/index.html](http://www.rufus-scientific.com/grouppersonality/index.html). No individual data or data identifying individuals is in this data set.

## RESULTS

### THE BIG FIVE PERSONALITY TRAITS

As this study is about team personality rather than team skill, I have used two measures of personality: the Big Five personality traits (as measured by the IPIP questionnaire) and a workstyle measure (described below).

The Big Five personality dimensions are widely used as descriptors of underlying personality traits.<sup>33,34</sup> Terminology differs slightly between studies: the terms used here are:

- Extraversion: outgoing, social, seeking stimulation from the company of others vs

quiet, solitary, preferring small groups or individual pursuits

- Agreeableness: trusting, compassionate, empathic vs suspicious, un-empathic, less concerned with others
- Conscientiousness: efficient, liking completion, detail-orientated, self-disciplined vs relaxed, easy-going
- Emotional stability: able to cope with adverse emotions, not prone to emotional extremes, good impulse control vs 'moody', subject to substantial changes in affect and motivation
- Intellect or Imagination: curious, interested in new ideas and experiences, preference for novelty vs prefers the predictable.

These are as much a reflection of someone's self-image as an absolute measure of some neurological activity. However the Big Five are generally accepted as features of people's core psychology that reflect how they behave in a variety of situations. They are also reasonably stable over time: as an illustration, I have taken my own test six times over 5 years, and the scores remained very consistent (Extraversion 50 (standard deviation of 6 results over 5 years = 3.3), Agreeableness 51 ( $\sigma = 1.9$ ), Conscientiousness 74 ( $\sigma = 4.4$ ), Emotional Stability 31 ( $\sigma = 2.8$ ), Intellect or Imagination 95 ( $\sigma = 1.4$ ) (c.f. Figure 5).

The International Personality Item Pool is a scientific collaboratory for personality difference tests, and I have used one of their tests essentially unaltered to develop a profile for this study (see *Methods*, above). Note that the numbers generated by the test are relative for each characteristic of personality, and can *only* be used to compare different individuals or groups for one character. If someone has an Extraversion score of 70 and an Intellect and Imagination score of 80, it does not mean that they are more intellectual than extrovert. It only means that they are more extrovert than someone with an Extraversion score of 60, and have less of the Intellect and Imagination score than someone with a score on Intellect and Imagination of 90.

## WORK STYLE

My other probe for personality is not formalised in the psychology literature as far as I know, but reflects what is a common observation among anyone trying to get someone else to complete a task, from doing their schoolwork to writing their shareholder reports. Some people send in work well in advance, some only at the last minute. I therefore devised a simple measure of what I describe

as Deadline Brinkmanship (DB). As part of their assessment, students were asked to write two or three (depending on the syllabus for the year) short analyses on case studies (typically 300 words) to be submitted by e-mail by the start of the next session 2-4 days' after the task was set. Sessions started at 9am. The case studies were then discussed during the session, and the student scripts marked and commented on afterwards. I recorded the time the e-mail was sent by each student, and (solely for the purposes of this study, and without using the data for any other purpose) rank ordered the students according to when their e-mailed submission arrived. Figure 3 shows the distribution of submission times for three years. There is a wide distribution of times, from submission two days before the deadline to 10 minutes before the session started. Obviously there are many reasons why someone sends an e-mail at a particular time. For example, there is a clear dip in submissions between 3 and 7 hours before the 9am deadline, which is between 3am and 7am, when the students would reasonably be expected to be asleep or socializing. However the rank order in which students submitted their work were moderately consistent: the difference between submission rank order from one week to the next for each student averaged 4.68 places across the five years of this exercise — if work was submitted essentially at random, a difference of 8.04 places (standard deviation 1.07 places) would be expected of a group of 24 students.

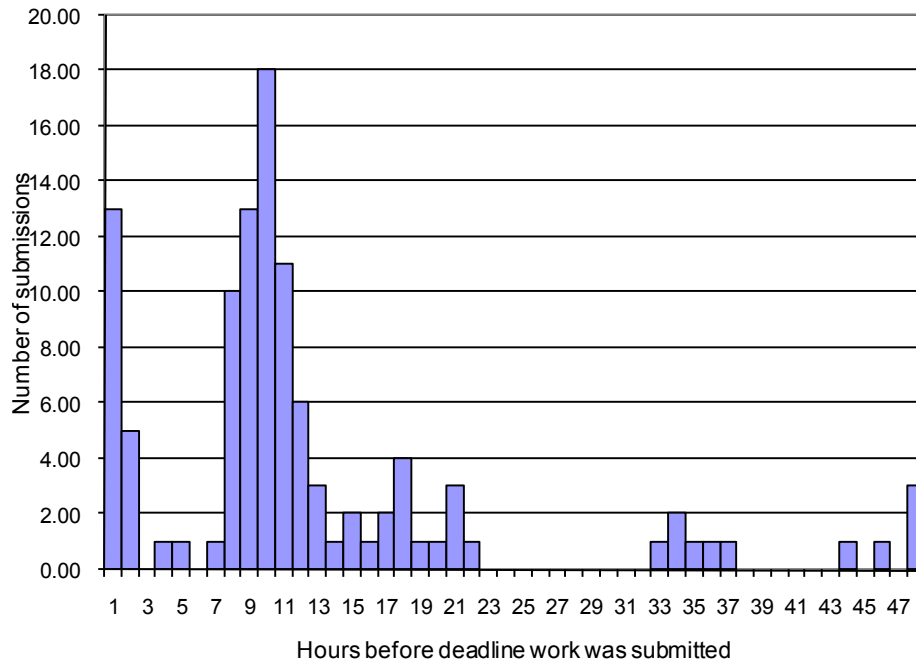
DB is weakly correlated with Conscientiousness (i.e. students with higher Conscientiousness scores tended to submit their work slightly later), other personality traits showed no correlation with DB (Table 2).

## HAPPY GROUPS

The main focus of my study was on what made a team work well together, i.e. what made a *happy* team, rather than what made an entrepreneur, although I can address this second question as well (see *Entrepreneurs and personality*, below). It is clear that teams with members who have wildly different personality types<sup>35</sup> or extremely different cultural backgrounds<sup>36</sup> function badly. However such extremes are filtered out by the application process for a Cambridge University degree.

During the term I set the students group tasks, and put them into groups that were selected to be i) optimised for match of their DB score, ii) optimised for their match for IPIP score, or iii) optimised for some other criterion. Other criteria included the marks they gained on the first exercise, how close they sat to someone in the class, and marks on other parts of the course — preliminary studies of groups in this and other modules of the course suggested that these different criteria had an equally





**Figure 3:** Time of submission of student work

Hour before the due time (09:00) when students submitted their individual written work for assessment, for 110 student work submissions between 2010 and 2012 inclusive. Y axis – number of students. X-axis: hour of submission, ie ‘1’ = in the last hour before the deadline (08:01 to 09:00).

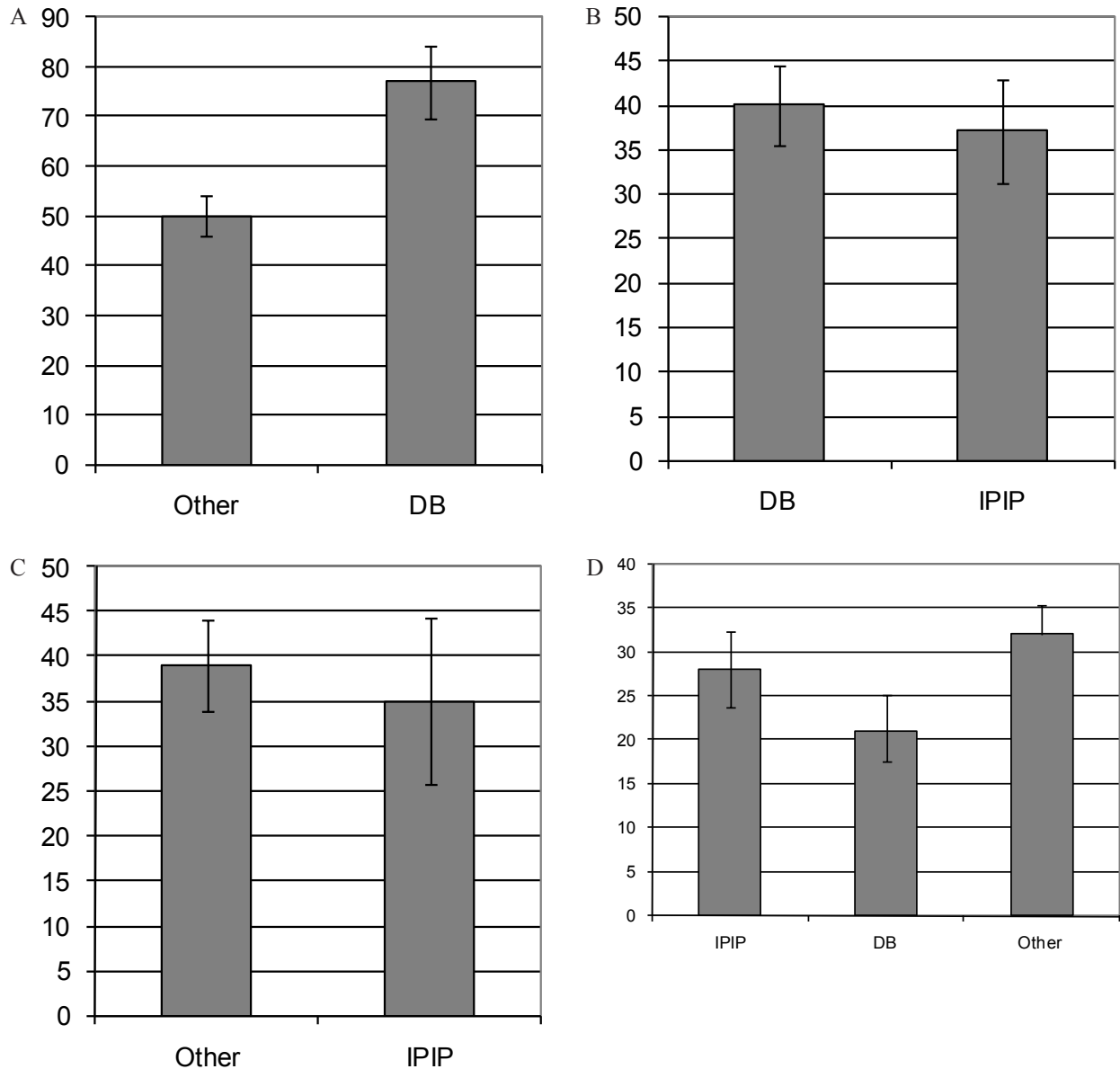
**Table 2:** Correlations between psychological measures

	Extraversion	Agreeableness	Conscientiousness	Emotional stability	Intellect or imagination
Extraversion					
Agreeableness	0.483				
Conscientiousness	-0.013	0.120			
Emotional stability	0.302	0.351	0.058		
Intellect or imagination	0.249	0.030	0.180	-0.005	
Deadline Brinkmanship (students only)	-0.085	-0.090	0.311	-0.229	0.165

small effect on group preference (not shown). I did not tell the students the criteria used for putting into groups until the end of the term. At the end of the term I asked for them to anonymously indicate which group they had enjoyed working with most and which group least, *disregarding* the task the group had to perform.

The result of group preferences are shown in Figure 4. The data is fairly noisy, as the design of the questionnaire as well as the course syllabus (and hence the tasks the groups had to perform) changed each year, and obviously the syllabus had to take precedence over

the requirements of this study. It is also notable that the answers are non-commutative — sometimes students stated on their written replies that they preferred A to B, B to C and C to A. However it is clear that groups selected on the basis of DB were preferred over those selected on non-personality-based selections, and groups selected on the basis of DB are disliked least. Figure 4 hint that groups selected by DB are preferred to those selected by IPIP, but the data on this is not conclusive.



**Figure 4:** Group preferences for groups selected by different criteria

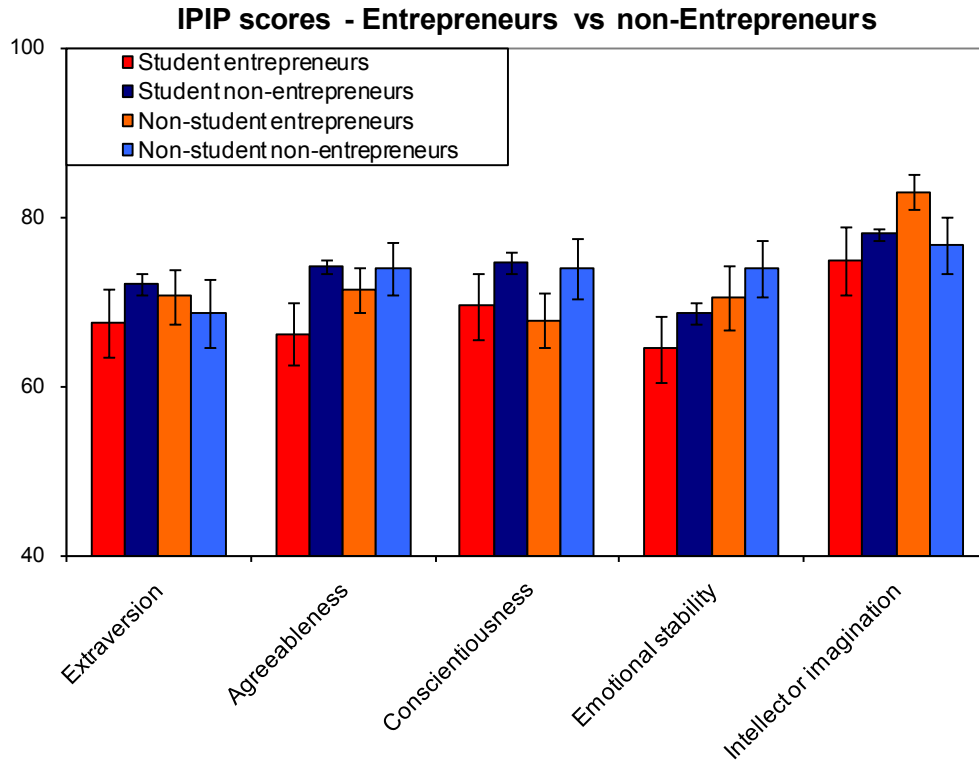
Stated preferences for working in groups selected by different criteria. Y axes: numbers of students stating a preference. (Note that the totals are not the same for each section, as not all students stated a preference for one group over another). A to C: summary of statement as to which group they preferred. A: Preferred groups selected for compatible Deadline Brinkmanship versus groups selected by other criteria not including IPIP scores. B: Preferred groups selected by Deadline Brinkmanship vs groups selected by IPIP scores. C: Preferred groups selected by IPIP profile vs groups selected by other criteria not including DB. D: Which group did the student dislike most?

## ENTREPRENEURS AND PERSONALITY

Whether there is really an ‘entrepreneurial personality’ is controversial. This study was not primarily aimed at identifying entrepreneurs but exploring teams, but I also collected data from the students on whether they had shown entrepreneurial traits before the course and whether those who graduated before 2013 had done anything

entrepreneurial after graduating. I defined ‘entrepreneurial’ very narrowly, as described in *Entrepreneurship*, above, so as to have as consistent a definition across the varied nationalities and background of the student group as was practical.

I compared the IPIP personality scores of entrepreneurial and non-entrepreneurial student groups. The results in Figure 5 show clearly that there is no significant



**Figure 5:** IPIP characteristics of entrepreneurs

*IPIP characteristics of 125 students and 36 non-students from the Cambridge biocluster. I divided people into 'Entrepreneurs' and 'Non-entrepreneurs' based on whether they had started a new, independent enterprise at their own risk (See 'Entrepreneurship'). Y axis: raw scores on the IPIP 'Big Five' personality dimension test. X axis, 'Big Five' personality categories. Error bars = Standard Error of the Mean. See text for details.*

difference between entrepreneurs and others in this group. As a control I also asked a number of people involved in the biotechnology industry in the Cambridge area to fill in the IPIP form as well: they also showed no strong difference between entrepreneurs and non-entrepreneurs, other than that entrepreneurs are marginally less conscientious. The students, especially those who had entrepreneurial experience, also seemed to be more nervous than the non-students, which in the employment climate over the period 2008 to 2013 is understandable. It is tempting to see the pooled set of entrepreneurs as being less conscientious and more anxious than non-entrepreneurs as a whole, but this is of marginal statistical significance.

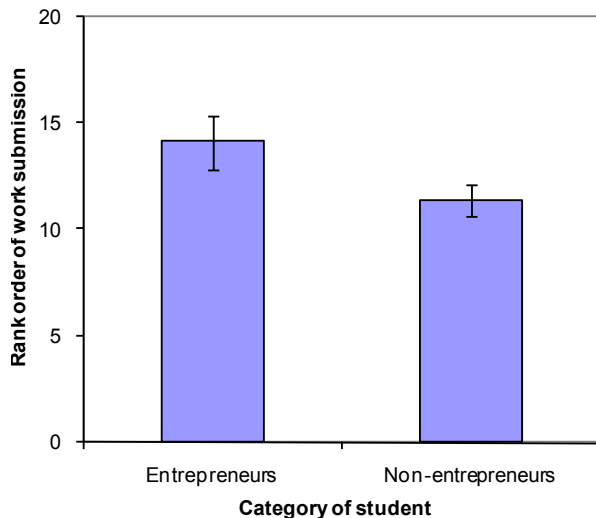
There is no significant difference in age between entrepreneurial and non-entrepreneurial students (Entrepreneurial average age = 26.2 years,  $\sigma = 5.31$ , non-entrepreneurial = 24.3 years,  $\sigma = 3.55$ ). I did not ask non-students their age.

With one exception, this is consistent with a range of other studies on the personality profile of entrepreneurs. Extraversion is generally unrelated to attempted or successful entrepreneurial activity,<sup>21,37,38</sup> although

a few studies find enterprising individuals to be more extravert.<sup>39</sup> Agreeableness in founding teams may<sup>37</sup> or may not<sup>21,39</sup> be correlated with venture success. Some studies have found that entrepreneurs score higher on emotional stability than non-entrepreneurs,<sup>40,41</sup> which the results in Figure 5 do not support, and in fact weakly contradict.

Interestingly, however, the entrepreneurs scored significantly higher on the Deadline Brinkmanship score (i.e. handed in their individual, assessed work significantly later) than non-entrepreneur students (Figure 6). I also ran a version of the betting game described by Shiv et al<sup>42</sup>: in summary, students flipped a coin up to 20 times, losing 1 point at each 'tails' and gaining 1.5 points at each 'heads'. They could stop at any time before 20 throws if they wanted. The student with the most points won £20. This test of risk aversion illustrates that people often stop playing after a run of good or bad luck, even though statistically it is best to keep playing for all 20 throws. Unexpectedly, entrepreneurial students seemed to be more likely to stop playing before the end (Table 3), although the results were far from statistically significant.





**Figure 6:** Deadline Brinkmanship score and entrepreneurship

Average rank order in which students handed in individual work to a deadline ("Deadline Brinkmanship") for students classified as 'Entrepreneurial' vs 'Non-entrepreneurial'. Error bars = Standard Error of the Mean.

**Table 3:** Risk game results

	Complete	Stopped
Entrepreneurs	7	6
Non-entrepreneurs	25	12

Risk game results. Students were asked to throw a coin 20 times, with a final score depending on the number of heads thrown. At any point they could chose to stop. The reward was biased towards continuing to throw the coin. Shown are how many students threw for the complete 20 throws ("Complete") or stopped early ("Stopped") for students classified as entrepreneurial or not according the criteria in 'Entrepreneurship'. Chi squared test of the hypothesis that there is no difference between Entrepreneurs and non-entrepreneurs as to whether they completed the run of 20 throws or stopped early = 0.786, critical value for one degree of freedom for  $p=0.05$  is 3.84, so the null hypothesis that there is no difference between entrepreneurs and non-entrepreneurs is not rejected.

## CONCLUSION

This is a relatively weakly powered set of observations. Better experiments would have tested the students on four or five submission tasks to measure DB, and group preferences for at least 6 tasks for groups selected for minimal and maximal in-group differences in DB, IPIP scores and another characteristic (probably marks in previous assessments). Attempting to do this however

would have distorted the curriculum for the degree, and so would not have been ethical.

This study addresses the under-explored period of new venture formation between the entrepreneurial decision to pursue a business idea and its execution. I do not address what motivates the entrepreneur to start, or stick with, an enterprise: the complex nature of such motivation has been discussed extensively elsewhere (see discussions and references in refs<sup>9,10,12,32, 43</sup>). What I address here is, once the decision to start is taken, what might help to keep the team together until that first success point is reached?

The Big Five personality traits seems unrelated to how well groups worked together, which is consistent with weak and inconsistent correlations of Big Five personality traits in the literature to entrepreneurship. The measure of workstyle that I have called Deadline Brinkmanship is better correlated with both happy team working, and with entrepreneurship. This is perhaps unexpected. Forming a biotech start-up does involve a range of deadlines: patents must be filed and prosecuted on time, presentations prepared for specific meetings, web site and other material launched for fixed conference and meeting dates and so on. However such tasks are a minority of the work that the Founding Partnership must do. To an extent the correlations with entrepreneurship reported here are all consistent with the idea that entrepreneurs accept a "last minute, good enough" approach. However the 'Deadline Brinkmanship' measure is also a useful pedagogical measure to show teams how working style can affect team dynamics, and to happy teams that can stick together through foundation and start-up phases.

More than anything else, that will help show you whether you will be happy to work together on the long and perilous course to a successful enterprise. Working together on an important task with a fixed deadline may be a useful test for any Founding Partnership to see probe how happy they might be working together on the long path ahead of them.

## ACKNOWLEDGEMENTS

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