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Working Paper

Mentoring in Startup Ecosystems

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Mentoring in Startup Ecosystems

A multi-institution empirical analysis from the perspectives of mentees, mentors and university
and accelerator program administrators

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1. Introduction

What helps entrepreneurial teams and mentors thrive in mentorship programs? The entrepreneurship literature on mentoring is scarce (as discussed in Allen, Eby, & Lentz, 2004; and Higgins & Krams, 2011; Memon et al., 2015), despite a surge in entrepreneurial mentoring programs. Mentoring is as indispensable as startup capital for the entrepreneurial industry (e.g., see MicroMentor Business Outcomes Survey). At the same time, research strongly supports the importance of mentors for entrepreneurial learning (e.g., Memon, J., Rozan, M. Z. A., Ismail, K., Uddin, M., & Daud, D. (2015).

Mentoring has become an essential factor in entrepreneurial success because mentors can help entrepreneurs overcome setbacks they commonly face in the early stages of their entrepreneurial ventures (e.g., Baron, 1998; Patzelt & Shepherd, 2011). Despite its importance in helping entrepreneurs build a profitable venture, the full potential of mentoring relationships is rarely realized.

At the same time, several recent surveys indicate that mentoring can make a significant difference in education. For example, a Gallup survey of 30,000 students found that those who "had a mentor that encouraged their goals and dreams" were "twice as likely to be engaged with their work and thriving in their overall well-being".[1] However, while the general importance of mentoring for entrepreneurial success is widely acknowledged, the success factors behind mentoring have not been examined. This report, sponsored by a grant from the Kauffman Foundation, is one of the first attempts to address this gap.

In this report we document the results of a large-scale survey of 33 entrepreneurial programs across the United States drawn from National Science Foundation's Innovation Corps (I-Corps™) universities, Techstars, and the EFN Network. We surveyed mentor, mentee, and program administrator perspectives about the mentoring program(s) they have been part of. We also examine data on the formal structures of the mentoring programs of the participating programs. In addition to surveying multiple perspectives (mentor, mentee, administrator), our data includes both university and non-university (entrepreneurial accelerator) program participants and administrators, allowing comparative analysis of these programs.

The goal is to help entrepreneurs, mentors and organizations supporting mentorship programs understand the dynamics of successful mentorship relationships. To accomplish this goal, the surveys and this report address several topics.

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[1] (Gallup, May 6, 2014, http://www.gallup.com/poll/168848/life-college-matters-life-college.aspx; Inside HigherEd, https://www.insidehighered.com/news/2014/05/06/gallup-surveys-graduates-gauge-whether-and-why-college-good-well-being).

- What is mentoring and what value does it contribute?

- What constitutes effective mentoring and who is qualified to be a mentor?

- What is really going on in these mentoring programs?

- How are they designed and how do they function?

- Who are the participants and how do they interact?

- What kinds of assumptions and expectations do the participants have?

- What are the critically important success factors that may contribute to valuable outcomes?

- How can the mentoring process be further improved?

- How can mentoring be learned?

- How can entrepreneurs be trained so they can benefit more from mentoring programs?

The definition of a mentor compared to an advisor or coach is important to understand. The surveys provide definitions of each and ask respondents to select what role they played or whether they believe they got advice, coaching and/or mentoring. Coaching has become a popular term and is generally applied to personal advising on career issues. Even CEOs today receive coaching on internal and external communications, for example, on sensitivity to gender issues. Many consultants now also advertise themselves as coaches/mentors for startups. Their motivation is generally to work with a promising new venture and receive equity as compensation. They are offering their experience and usually expert advice. How are coaches different from mentors? Perhaps the distinction is not important, but one way would be to describe a coach as someone who helps you be "the best you can be", while a mentor, in the context of a startup, helps you "explore the unknown challenges of the entrepreneurial journey."

To be effective as a mentor, common sense tells us this individual will need specific personality traits and communication skills, beyond any industry knowledge, expertise, or experience. A mentor will need, not only a growth mindset (i.e., the belief that most abilities can be learned), but also a broad professional background and true empathy. Mentors should care about their mentees and not become a mentor primarily to benefit her/himself. Mentees will feel this caring (or lack of it) and the relationship will be influenced. It is common sense that mentees highly value people who they feel are "looking out" for them. Likewise, mentors will value mentee relationships more if they feel that their mentees care about their relationship and work to develop it.

A mentor need not and should not provide all the answers to questions a mentee may ask. If the common objective of a mentoring relationship is to provide opportunities for both mentors and mentees to grow (through learning), then everyone's energy and focus should be the issue of

"How can we learn most effectively?" Is it counter-intuitive to believe that the growth of the startup will follow that of the entrepreneur and the team as a whole?

This leads to a working definition of the role of a mentor as someone who:

1) inspires curiosity

2) challenges assumptions and expectations (gives feedback)

3) guides through asking probing questions

4) is honest and direct about what he/she doesn't know

5) is eager to learn, along with the mentee

This type of joint learning experience by mentor and mentee is a new challenge for academia, industry and society, reflecting the importance and recent emphasis on innovation and entrepreneurship as drivers of economic growth. Students often complain that their universities don't offer practical, (hands-on, action-based, experiential, applied) courses in entrepreneurship, and that many courses are still taught in the traditional way of lectures and business cases. Should universities provide more practical kinds of training? Increasingly, the answer given by students (and their families) to this question is a resounding "YES!" Entrepreneurship should not be taught in the conventional way.

The entrepreneurial journey is more akin to mountain climbing. A student can learn about the tools and equipment, he or she can develop the muscle strength and coordination that is needed, he or she can study detailed maps of Mount Everest. But, will that mean he or she will be able to climb Everest, if he or she has had no experience actually climbing smaller mountains? The sherpas of Everest are famous because they know the mountain so well and they are intimately familiar with the environment. Experienced mentors are more like Sherpas — guides who can read signs of impending storms, fragile rock surfaces, and other impediments to success.

Our research team includes both academic researchers who focus on interpersonal relationships in entrepreneurship and business, an academic who runs robust mentoring programs within a 13 year old University of Michigan technology commercialization program through which 190 entrepreneurial companies and 950 UM students which have been assisted, and a 30+ year old "venture fair" through which 1,300 companies have been helped with capital raising, and a practitioner who is a founder of Enterprise Futures Network (EFN), a non-profit organization whose mission is to empower young innovators and entrepreneurs through mentoring. EFN is a decade old entrepreneurial network with 14 university partners and is comprised of more than 400 mentors and over than 4,000 entrepreneurs. EFN mentors 150 university start-ups a year at more than 75 universities and recent graduates. EFN's founders are passionate about the topic of mentoring and have dedicated their lives to the art.

The experience of both the commercialization program and EFN shows that the process of effective mentoring is much more complicated than most people realize. Mentoring is contextual, in multiple dimensions. Startup projects will differ by industry area, stage of growth, cultural context, and educational background. Every single aspiring entrepreneur and student team will be unique, in terms of personal history, characteristics, ambition, skills, and mindset.

Effective mentoring programs are very difficult to structure and execute, even with the best intentions and reasonable budget. Whether it is because mentoring programs are not well supported, planned or implemented or program administrators don't understand success factors well, most of the programs are not strong and even the very best programs can improve significantly. As a result, benefiting from a strong mentoring relationship remains a barrier to the development and success for many entrepreneurs.

Our empirical findings reveal several insightful results. For example, our data suggest that while age and gender of mentees and their mentors appear to have no effect on mentoring outcomes, implicit beliefs about personality and the malleability of entrepreneurial skills among the mentee and the mentor is shown to matter. In particular, growth mindset (the belief that people can learn most abilities) is found to be a predictor of satisfaction with the program and with the mentor relationship. Further, university and non-university programs have several noteworthy differences regarding the formal procedures around setting up and managing the mentee-mentor relationship. As we describe in detail, university programs lag behind along several important dimensions when it comes to matching mentees to mentors, providing support during the program and following up after the completion of the program.

In the next section of this report, we discuss in detail the results for each surveyed group (administrators, mentees and mentors). We then synthesize the findings and provide several prescriptive recommendations for program managers. The description of our data collection and analysis and the complete results are provided as appendices.

2. Results: Program Administrators

We received responses from 42 program administrators (there were 33 organizations, however some organizations had multiple administrators; see Appendix D for the list of the organizations). We collected administrators' reflections of the nature of the program, the qualities and expertise programs seek in mentors, the resources they offer during and/or after the mentoring, and the challenges they encounter.
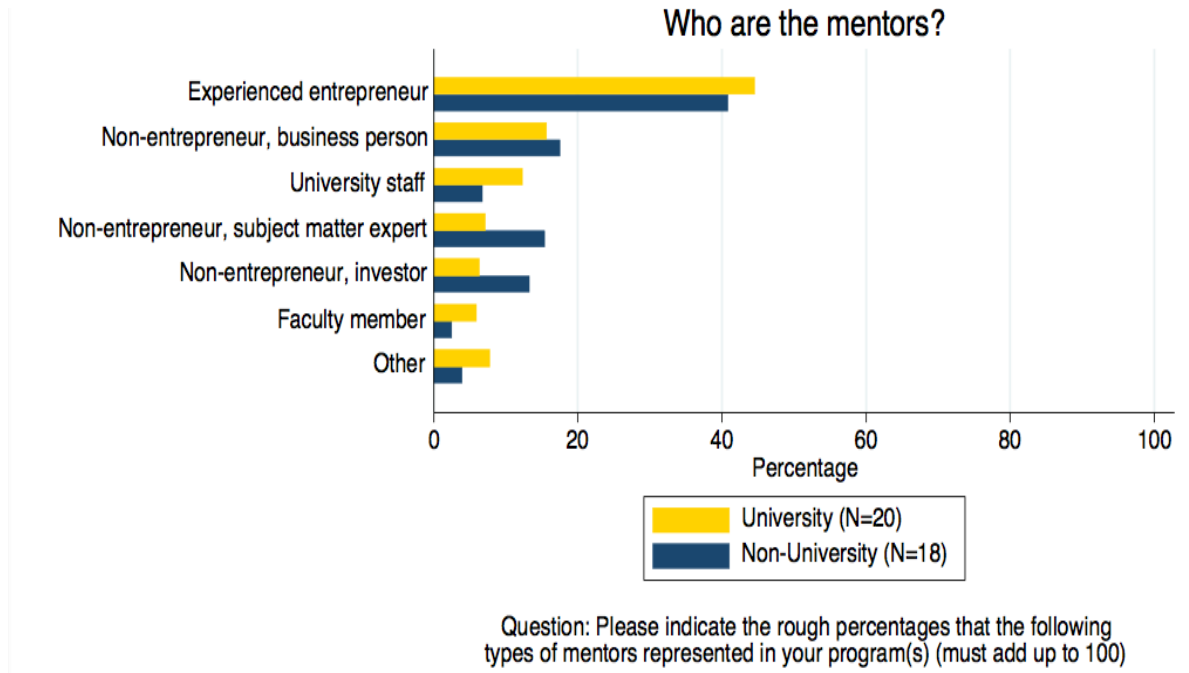
General program features

Across different programs we saw that the most represented group among the mentors were experienced entrepreneurs, many of whom were informal or angel investors. There were some differences among the remaining categories, with non-university programs featuring more non-entrepreneur domain experts and investors, and fewer university-affiliated mentors.

University and non-university mentoring programs differ in terms of program enrollees, duration and program size (in terms of both mentor and mentee numbers). University programs typically last five months, whereas non-university programs last 3 months. In both university and non-university programs we saw similar mentor/mentee ratios of approximately two mentees per mentor. However, non-university programs are typically smaller, relatively to university programs (on average 30 vs. 60 mentees in a non-university vs. university program respectively, and on average 17 vs. 28 mentors in a non-university vs. university program respectively). Further university programs feature two- or three-person teams, while non-university programs often include sole founders instead of teams. University-based programs may be of at least two general types: (1) those offered as part of a curriculum to enrolled students might have a primary or mixed educational motive, which may be pursued through standard course structures, administered and offered by university personnel, e.g., faculty, technology transfer operatives, and (2) accelerators and "university venture centers", funded by the university and private donors, the entrepreneurial clientele of which may include post-graduates whose objective is strictly linked to successful development of the entrepreneurial venture, which may be built around the university's research-driven intellectual property. The nature of mentorship may be entirely different between these two types.

Who are the mentors, why do they participate and how are they recruited?

University and non-university programs have a similar composition of mentors. Both types of programs feature many experienced entrepreneurs (approximately 40%) and a collection of other mentor types with university programs typically recruiting more university affiliated mentors and fewer investors and subject matter experts.[2]
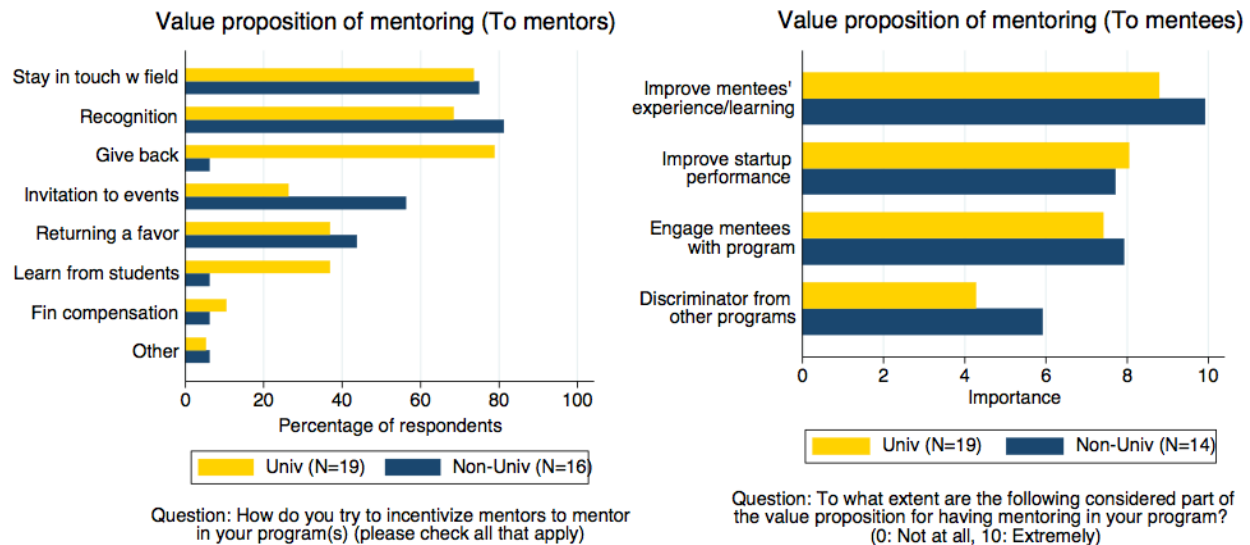
Who are the mentors?

Question: Please indicate the rough percentages that the following types of mentors represented in your program(s) (must add up to 100)

Programs use different incentives to attract mentors. Both university and non-university programs attract mentors by offering the opportunity to stay current with the industry area (75% of respondents) and to receive recognition from participating in the program (70-80% of respondents). In addition, the vast majority of university programs list "giving back" as motivation for mentors to participate (80% of respondents). In contrast, many non-university programs offer an opportunity to participate in entrepreneurial events as an incentive (55% of respondents). Importantly, none of the university programs and only 16% of the non-university programs offered financial compensation to mentors. However, different from university startups, non-university programs report that mentors sometimes take economic interest (e.g., equity to join an advisory board, consulting assignments) in the startups they advise, particularly after the mentoring program is officially completed.

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[2] Some respondents did not answer all questions in the survey. As a result, the number of respondents in each graph may vary. The exact number is indicated in the graph legend.
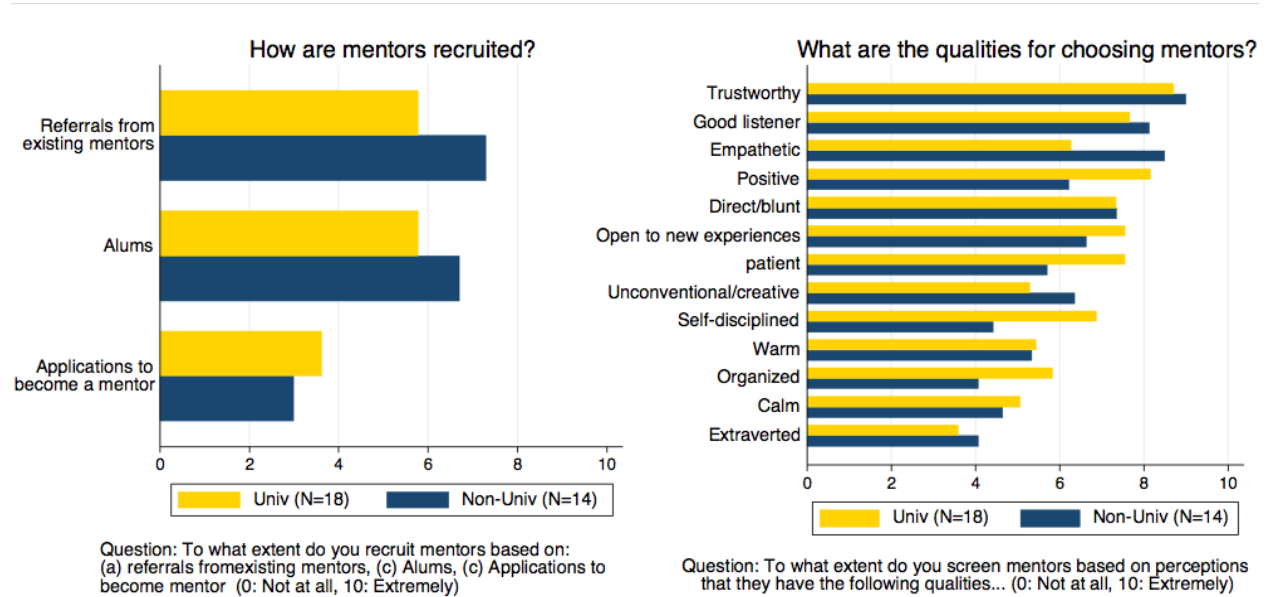
University and non-university programs have a similar value proposition to mentees, with the focus on improved mentee experience, mentee engagement with the program and improving overall startup performance.

Value proposition of mentoring (To mentors)

Question: How do you try to incentivize mentors to mentor in your program(s) (please check all that apply)

Value proposition of mentoring (To mentees)

Question: To what extent are the following considered part of the value proposition for having mentoring in your program? (0: Not at all, 10: Extremely)

Programs recruit mentors from a mix of sources, primarily from referrals and program alums. A smaller number of mentors are recruited via mentors applying on a website without a referral. One of the most critically important factors is that program administrators must be very clear and explicit about the time and effort required of mentors. Brief interviews of prospective mentors (by program administrators or volunteer senior mentors) is a best practice. Unfortunately, regardless of how clear the programs are with mentors (many are not), some mentors often join without a strong desire to "give" and achieve their personal objectives (e.g., recognition, contacts) by offering a few brief calls without being "all in." These mentoring relationships lead to low mentee satisfaction. Programs that actively manage their mentor-mentee groups can identify these problems during the program and take action (e.g., by introducing a new mentor to a mentee, and/or removing a mentor) but it is more common for the groups to go through the program without intervention. Programs that meet with and/or survey the teams after the program may learn about an issue with a mentor and can take action (e.g., talk with mentor, screen mentor out for a future program).

In every context, the most sought-after qualities in a mentor are: being trustworthy, empathetic, a good listener and an effective communicator. From the mentor data, program administrators clearly choose mentors that embody these characteristics. When asked about their approach to mentorship, mentors stated that they focus on "establishing trusting connections", "[putting

themselves] in their [mentees'] shoes", "[listening] carefully", and "[asking] questions".[3] Of course, while not an explicit criterion for universities or non-universities, whether a mentor is expected to be caring toward mentees is critical in accepting mentors into the program. For more quotes, please see Appendix C. Further, university programs value being patient, self-disciplined and having a positive attitude.


How are mentors recruited?

Referrals from existing mentors

Alums

Applications to become a mentor

Univ (N=18)   Non-Univ (N=14)

Question: To what extent do you recruit mentors based on:
(a) referrals from existing mentors, (c) Alums, (c) Applications to become mentor (0: Not at all, 10: Extremely)

What are the qualities for choosing mentors?

Trustworthy
Good listener
Empathetic
Positive
Direct/blunt
Open to new experiences
patient
Unconventional/creative
Self-disciplined
Warm
Organized
Calm
Extraverted

Univ (N=18)   Non-Univ (N=14)

Question: To what extent do you screen mentors based on perceptions
that they have the following qualities... (0: Not at all, 10: Extremely)

How are mentors and mentees matched?

University and non-university programs appear to use different matching processes for assigning mentors to mentees. In particular different university programs use different procedures with mentors selecting or indicating preferences for mentees, as well as the program administrators performing the matching. In contrast, most non-university programs employ a two-sided matching process with both mentors and mentees first indicating their preferences and then the program administrator makes the actual match. The matching is typically performed using relevant expertise, experience and mentor reputation as matching criteria. In addition, universities put some emphasis on geographic proximity of mentors and mentees.

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[3] In addition to these illustrative quotes we categorize the responses to this and other qualitative survey questions. Please see sections 3 and 4 for the summary statistics of the responses and Appendices A and C for detailed information and additional quotes.

Few university or non-university programs use online systems to facilitate matching. Without a system for the mentors and mentees to communicate, two-sided matching is time intensive and difficult to implement, especially given the rigid university academic schedule.
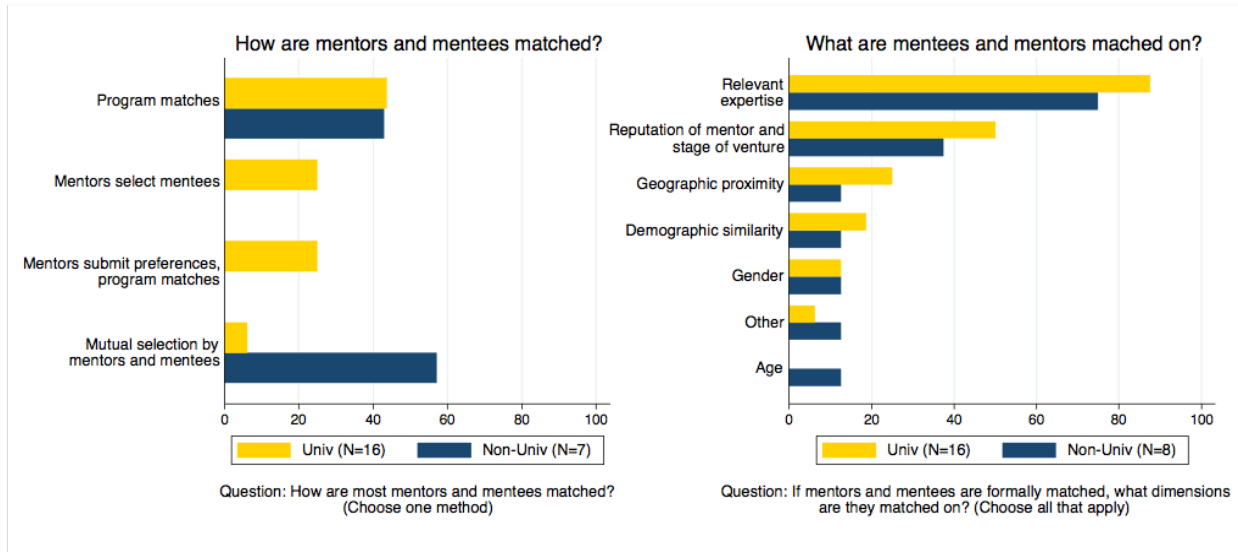
How are the programs managed?

University and non-university programs use different strategies to provide support before, during and after the mentoring. An important management approach, one that was not surveyed for but we know is very important, is to ask entrepreneurs if they want to be mentored. In private, non-university programs such as Tech Stars, only entrepreneurs who want to be mentored are accepted into the accelerator program. Universities have issues in their programs when they don't ask their entrepreneurs (or students) if they want to be mentored: if entrepreneurs don't desire a mentor (or another mentor), entrepreneurs/students will either not engage their mentor(s) or not engage them in a productive way. This situation causes mentors to be disappointed with the mentoring program and often results in program administrators spending considerable time addressing issues that could have been avoided if mentees were asked about mentoring in the first place. Another best practice is for universities to integrate mentoring in the entrepreneurship program description and orientation so participants understand what mentoring, its benefits and commitments from entrepreneurs/students. This also has positive implications for enhancing the supply of potential mentors, both peer-to-peer and more experienced to less experienced.

While most university programs do not provide formal training for mentors, half of the non-university programs do, perhaps because of the focus on financial interests of the program itself (many of which retain an equity fee in the mentored company). The training (if offered) typically covers orientation, including program roles and responsibilities and best practices, such as creating a schedule with one's mentee. Interestingly, after the training, very few non-university

programs track the mentoring relationship. In contrast, almost one third of the university programs actively manage the mentor-mentee relationship after the matching is complete. In general, training mentors and mentees on relationship dynamics and attitudes towards mentorship and learning (e.g., growth mindset) is uncommon.

During the mentoring process, most programs make little use of online tools and systems for managing the relationship between mentees and mentors. Among those that do use more advanced online systems, the primary use is to facilitate mentee/mentor management and communication. After the mentoring is completed, many university programs do not follow up with past mentees (other than recruit them as future mentors). If they do, they track only mentees or only mentors. In contrast, non-university programs engage in a more comprehensive form of tracking with 87% of the programs following up with both mentees and mentors.

Challenges and policies

Most program administrators name mentor availability as the biggest challenge, both in the university programs (56% of respondents) and in the non-university programs (72% of respondents). The difficulty of finding mentors can lead to a dangerous dynamic for programs because there is a tendency to relax their minimum qualifications and screening to reach the number of mentors they seek.

The next most critical challenge is effectively managing the mentor/mentee relationship. Further, some programs (particularly non-university) consider financial involvement of mentors an issue that can interfere with the quality of the mentoring relationship and have implemented rules regarding the mentors taking financial interest. In those programs, mentors are not allowed to invest during the mentoring process, or, must disclose the arrangement to the program administration. However, the majority of programs (61%) have no official policies regarding financial involvement of mentors. This can expose such programs to significant risk (e.g., reputational and even legal risk in some cases).

Some programs have explicit rules concerning removal of a mentor. In our survey, approximately half of the programs have removed at least one mentor from the list of invitees. There are many reasons to remove a mentor, but the most frequent ones are lack of engagement, and "inappropriate behavior" (broadly defined).

Some examples of these reasons include the mentor "being completely unresponsive to the team", "not acting in the best interest of the founder," and "wanting to take advantage of the mentee in any way." For more quotes, please see Appendix C. Different programs deal in different ways with mentor removal, but a large number of programs (about 60% of universities) have no formal process for this.

What kind of online systems are used to support/manage the mentoring process?

Categories (top to bottom):
- No system
- Mentor/mentee management, communication
- System for mentees to contact mentors
- Mentor application/screening
- Mentor matching

x-axis: percentage of respondents (0–100)

Legend:
- Univ (N=16)
- Non-Univ (N=14)

Question: Are online systems used to support and manage the mentoring process? (Choose all that apply)

Does program conduct post-program assessment?

Categories (top to bottom):
- No
- Both mentors and mentees
- Mentees only
- Mentors only

x-axis: percentage of respondents (0–100)

Legend:
- Univ (N=18)
- Non-Univ (N=14)

Question: Does your program typically conduct post-program mentee and mentor evaluation assessments? (Choose one answer)

What reasons could create a cause to remove a mentor?

Categories (top to bottom):
- Bad fit with mentee
- Inappropriate behavior
- Lack of engagement/availability

x-axis: percentage of respondents (0–100)

Legend:
- Univ (N=15)
- Non-Univ (N=13)

Question: What reasons would create a cause to remove a mentor or not invite a mentor back to participate in the program? (Enter text)

Is there a protocol for removing a mentor?

Categories (top to bottom):
- No formal protocol
- Yes: Other
- Yes: Talk with mentor
- Yes: Don't invite mentor back

x-axis: percentage of respondents (0–100)

Legend:
- Univ (N=17)
- Non-Univ (N=12)

Question: Do you have a protocol for removing a mentor from a team? (Enter text)

Apart from our survey, our experience is that programs with the most effective mentors have a strong culture of mentoring and learning that is created by program leaders and mentors. There is

strong commitment to invest in mentors who participate because they want to give back, learn and teach (mentees and other mentors). There is a sense of community built around shared values.

3. Results: Mentees

We surveyed 498 university mentees and 49 non-university mentees about their demographics, the nature of their businesses (or business ideas), their evaluation of and satisfaction with the program and about the value and content of the mentoring program.

Demographics

On average, university mentees and non-university mentees are of comparable age. However, the non-university mentees are more tightly clustered around 30, whereas a large group within the university sample are undergraduate students aged 20-22. In both samples women make up 20% of the sample. Further, the gender ratio remains approximately the same for younger and older mentees (Rank sum test by median split: $p = 0.352$).

University programs are generally more diverse with almost half of the mentees being non-white (Asians are the largest group within the non-white mentees accounting for 30% of the total mentee population). Indeed, the difference in the proportions of Asian mentees between university and non-university programs is marginally significant with higher Asian proportions in university programs (Rank sum test: $p = 0.078$). Further, Asian mentees are on average younger than everyone else, even after controlling for student status (Difference: 2.3 years, Rank sum test: $p = 0.078$).
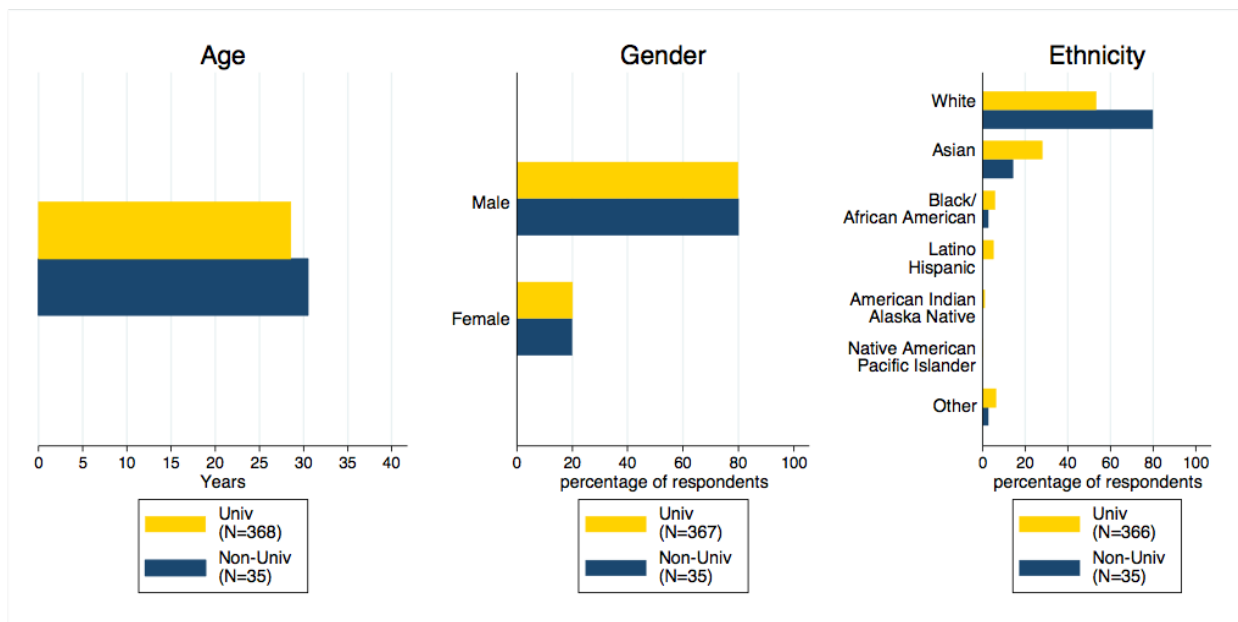
Is there a genetic/socialization bias toward entrepreneurship? The number of mentees with parents or other family members who are entrepreneurs differs for university and non-university programs. Specifically, 51% of the non-university (38% university) mentees have a relative who is an entrepreneur and 42% of the non-university (26% university) have a parent who is an entrepreneur.

College major, Industry and Stage of the venture

The educational background of university mentees tends to be more diverse with approximately 22% of the mentees having a social sciences and humanities background (compared to 13% of the non-university sample). Non-university and university teams are comparably distributed across different industries; however, a larger proportion of non-university teams are seen in the biotech and materials sectors (medical devices represented in 21% of all non-university teams). Non-university teams were somewhat more mature at the time of the mentoring, with approximately 75% either seeking funding or already funded (with at least some seed funding). In contrast, only 28% of the university mentees were prepared for external financing.
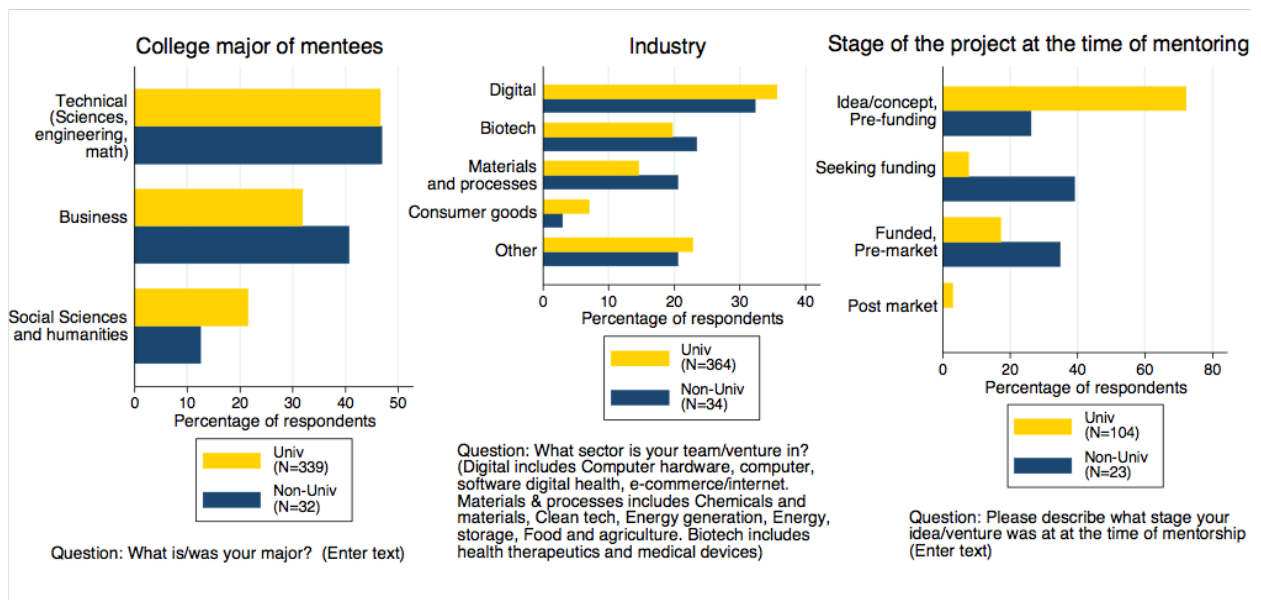
Frequency and content of mentor/mentee interactions

Both university and non-university programs exhibit high levels of interaction between mentees and mentors (an interaction is defined as a face-to-face meeting, a video conference or an email exchange). Mentors and mentees interact somewhat more frequently in non-university programs (63 vs. 56 interactions, on average). Additional analysis showed that this mainly consists of Skype meetings and email exchanges, and not by face-to-face meetings. However, the perceived

value added by mentor and the overall satisfaction do exhibit substantial differences between samples.

In all programs, mentors are strongly involved in the preparation and review of documents (business plan, investor pitch, etc.). In the non-university programs, mentors also assist mentees by connecting them to their networks, by introducing them to potential customers, investors, other entrepreneurs and experts.
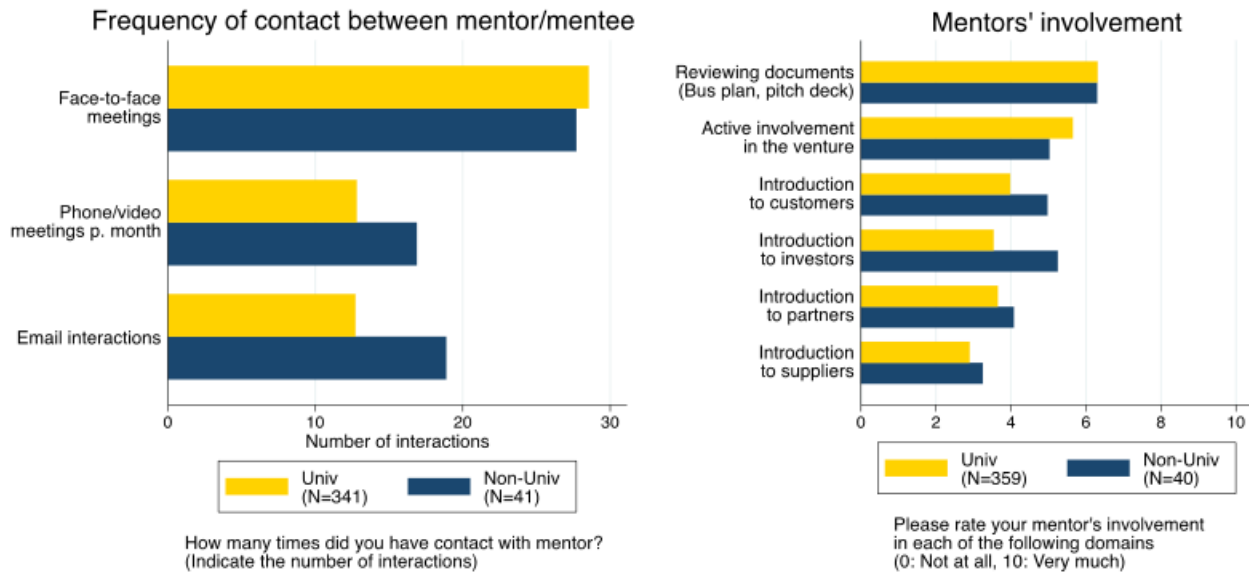
Satisfaction with mentoring program and evaluation of the program

Matching. Overall satisfaction with the mentoring program is not correlated to the matching procedure. Still, many mentees would prefer a procedure different from what they had experienced. Specifically, mentees in both types of programs wanted the opportunity to choose a mentor after talking with several potential candidates. In contrast, the most common matching procedure, in which the program selects the mentor, was the least preferred.

Matching approach (actual)

Program does the matching

Program provides options; Mentee chooses

Mentees talk to potential mentors, then ask mentors to work with them

Mentees choose mentors from a larger cohort

Mentors select mentees

Percentage of responedents

| Univ (N=367) | Non-Univ (N=41) |

How was your mentor matched to you? (Check all that apply)

Matching approach (preferred by mentee)

Program does the matching

Mentees choose mentors from a larger cohort

Mentees talk to potential mentors, then ask mentors to work with them

Program provides options; Mentee chooses

Mentors select mentees

Percentage of responedents

| Univ (N=371) | Non-Univ (N=41) |

What matching approach(s) would you prefer the most? (check one)

Frequency of interactions. Satisfaction with the mentorship program is related to how frequently mentor and mentee met. The strength of this relationship is modest, but the effect is statistically significant. In particular, the number of mentoring sessions is positively correlated with reported satisfaction with the program ($r = 0.128, p < 0.01$). Similar results hold for face-to-face meetings, video meetings and email exchanges.
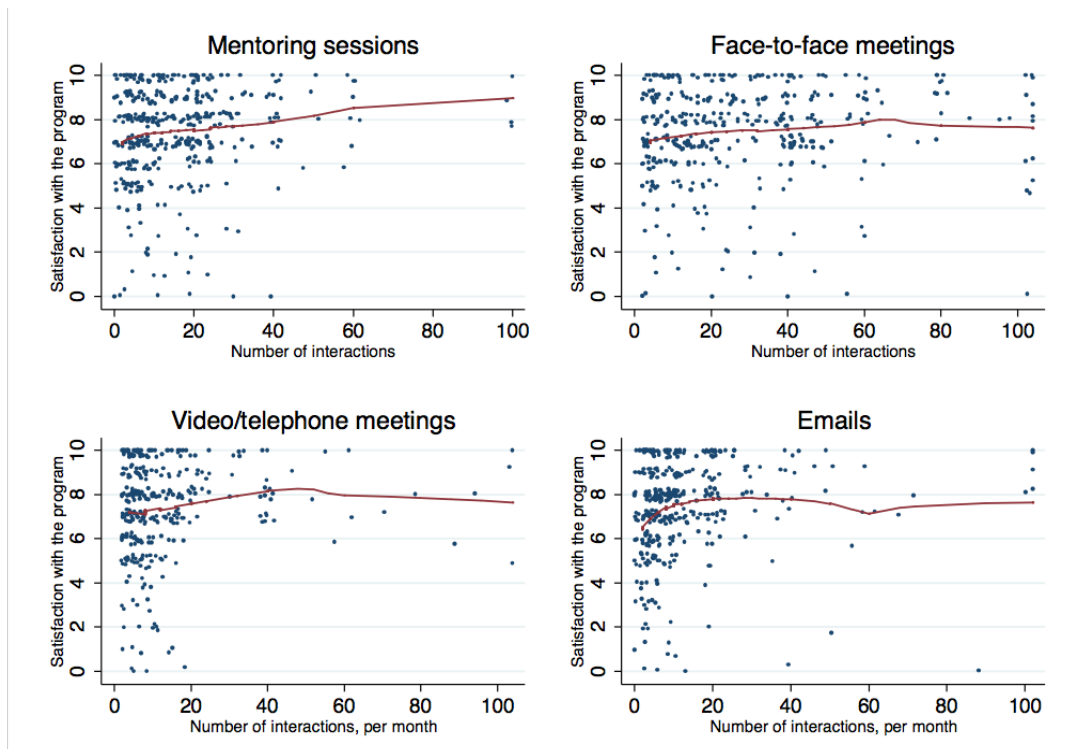
Gender, age, college major. Gender of mentee has no effect on intensity of mentoring, the perceived value added by mentor, quality of mentoring and overall satisfaction with the program. Similarly, there is no effect for the gender of the mentor, and interactions between the gender of mentee and mentor. Also, there is no statistical effect of age, or college major of the mentee on his/her satisfaction with the mentoring program.

Industry and stage of the venture. Satisfaction with mentoring is judged to be significantly more valuable by startups in non-digital industries (materials, biotech, consumer goods) relative to digital technologies (app and software). The difference is significant at $p < 0.01$ (Rank sum test). Further, the stage of the project (idea/concept/funding-seeking/funded) has no effect on the satisfaction with the program.

Growth mindset. Growth mindset of mentees, that is, the extent to which mentees believe that most skills needed for being a successful entrepreneur can be developed and learned, is positively associated with the perception of the mentor as helpful (particularly in terms of being constructive and professional). In contrast, mentees with a fixed mindset, that is, the belief that successful entrepreneurs are born with certain skills that cannot be learned, tend to report that their mentor influenced the venture in a negative way. Specifically, the correlation coefficient between growth mindset and evaluation of mentor contribution to the venture was $r = 0.337 (p = 0.000)$, suggesting that mentees' belief that they can learn to be successful entrepreneurs makes them see more value in the mentorship they received.

Growth mindset and evaluation of mentor contribution to the venture
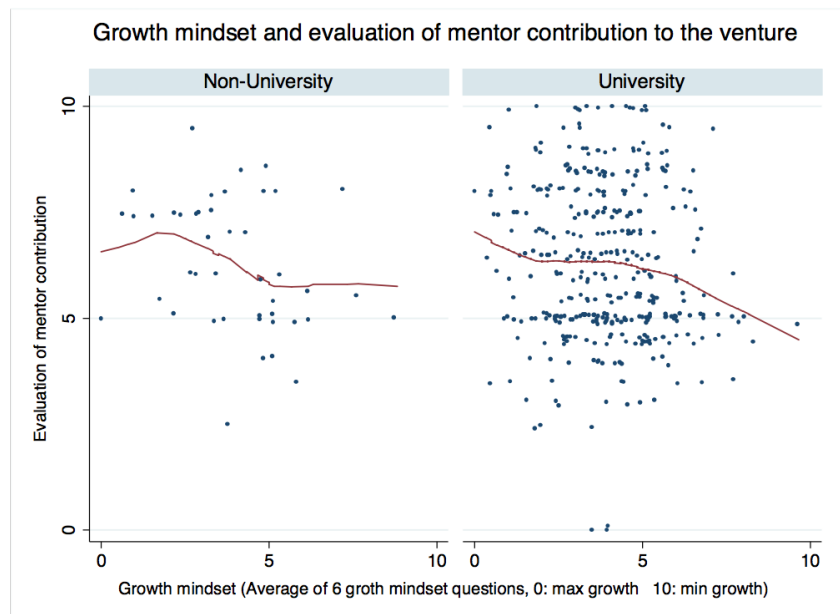
Mentor involvement Mentor involvement in the project/business and the assistance of mentor with preparing and reviewing important documents (business plan, pitch deck etc.) was positively associated with the overall evaluation of mentor performance ($r = 0.229$ and $r = 0.187$, $p < 0.01$) and with the overall satisfaction with the program ($r = 0.229$ and $r = 0.187$, $p < 0.01$).

Mentor-mentee training and reminders/tips during the program There was a substantial difference across programs in whether they provide training for mentors and mentees (50% of non-university and 29% of university programs). The content of the training typically includes the discussion of the mentor-mentee roles and the different forms of support that were offered by mentors. Importantly, the availability of training was positively associated with the frequency of interactions (both face-to-face and non-face-to-face meetings, (Rank sum test $p = 0.015$) and with the satisfaction of the mentee with the mentorship (non-significant, Rank sum test $p = 0.119$). Further, program support in the form of reminders/tips during the mentoring was positively associated with satisfaction ($p = 0.000$) and with the frequency of interactions ($p = 0.032$).

Presence of a competition/prize Many programs offer a competition/prize component (36% of university programs and 46% of non-university programs). 75% of the university mentees and 35% of the non-university mentees report winning a prize. Among the programs offering cash prizes, the average sum offered as a prize was $26,000 (Non-university programs) and $13,000 (University programs). However, availability of a prize was negatively associated with the intensity of interactions (both face-to-face and non-face-to-face meetings). It was not associated with being satisfied with the mentorship. Further, winning a prize was not associated with the evaluation of mentorship.

What are the success factors of mentoring programs and why do mentors help (according to mentees)?

In addition to measuring the relationships between mentee satisfaction and evaluation of mentor performance we also asked mentees directly what they thought were the success factors of mentoring. When describing how mentors can help university and non-university mentees often name "guidance" as the most important factor. For example, one mentee said, "Entrepreneurial mentors provide more tangible insight into the world or market you're trying to be in business with. In essence, they help bring ideas back down to earth where they can grow… mentors are helpful in providing information and contacts to jumpstart a business and acknowledge the risks". Another mentee said, "[…] entrepreneurs help me avoid mistakes that are easily solved with experience". In addition, non-university mentees often refer to the mentor's network and connection as being helpful. One mentee said that his mentor added value by introducing him to "people that can help [him] with specific parts of [his] business, and people that may have unique insights into different areas of [his] business". When asked about the mentors' motivation

to participate in the program most respondents think that mentors want to give back to their community or to struggling entrepreneurs. One mentee said, "I believe entrepreneurial mentors take the time to help because they are willing to help and aid in making the road a bit easier for others to accomplish their goals." Another mentee stated, "[they have a] desire to share their experiences and educate other entrepreneurs because they believe in the power of innovative ideas and their ability to improve the world around us." Different from the non-university sample, university mentees also think that mentors derive personal satisfaction from being able to help. Mentees stated they believe mentors "find the process exciting" and that they "enjoy supporting new ventures". For more illustrative quotes, please see Appendix C.
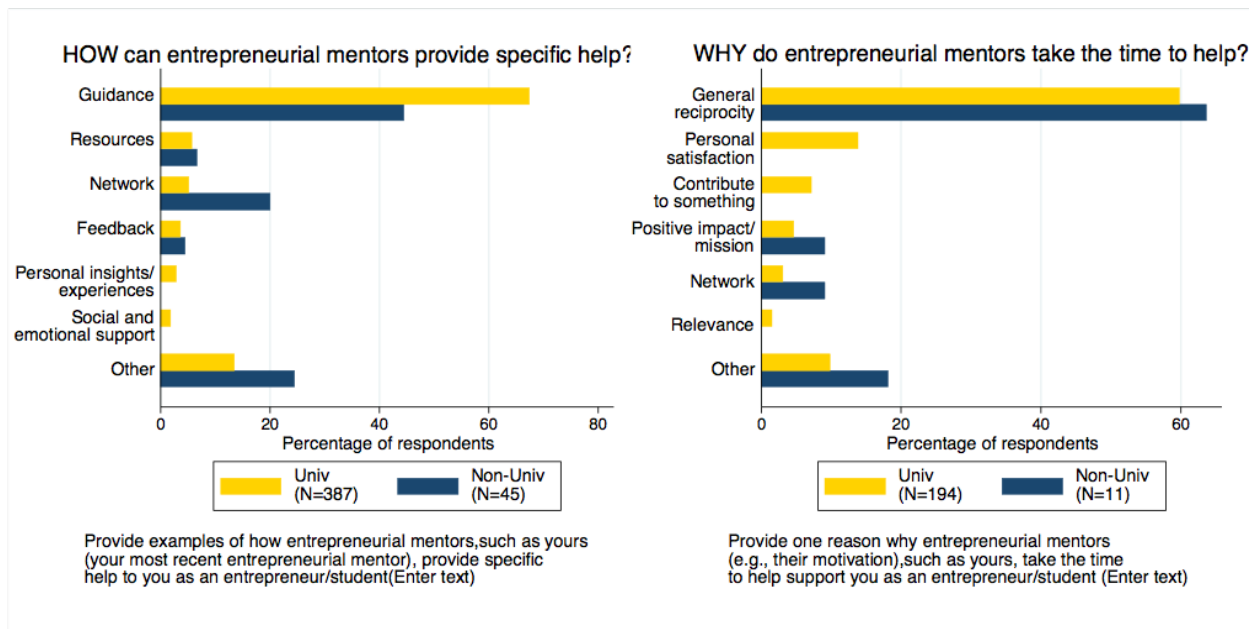
When asked about their own experiences, mentees gave answers that were similar to the more general question about the success factors of mentoring. Non-university mentees value both guidance and network expansion, whereas university mentees believe that they mainly benefit from guidance. Only very few respondents find that mentorship did not contribute to their venture's success. Regarding the mentoring program, both samples report that the fit between mentor and mentee, as well as regular exchanges were most helpful. The latter is particularly important for non-university respondents.

How did your mentor contribute to your venture's success?

Please describe how your mentors have contributed to your venture's success. (Enter text)

What contributed to the success of your mentorship?

What was it that most contributed to the effectiveness of your mentorship? (Enter text)
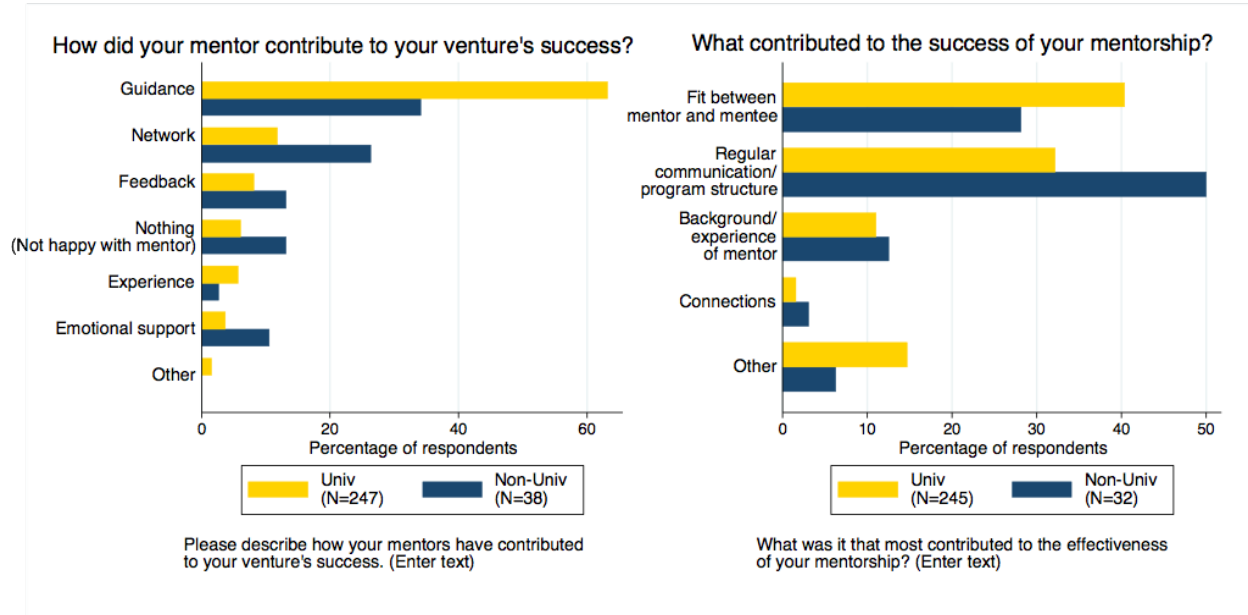
4. Results: Mentors

We surveyed 220 university mentors and 55 non-university mentors about their background and area of expertise, perspective and attitudes to mentoring in general, and their evaluation of and satisfaction with the program and about the value and content of the mentoring program.

Demographics

The average mentor is 45 (52) years old in the university (non-university sample). Relative to the mentee population mentors are more homogenous both in terms of gender and ethnicity. Only 13% (15%) of mentors are women and only 20% (13%) are non-white in the university (non-university) sample.

Mentor background and expertise

Mentors in the non-university and the university samples have a similar level of mentoring experience. On average, they have mentored 6 teams in the past, and have participated in the mentoring program for 2 years. However, the level of experience is unevenly distributed among mentors (the distribution is skewed to the left and has a long tail). This is particularly true in the university sample, in which 60% of the mentors have advised only 1-3 teams and a few very experienced mentors have advised >10 teams. Similar results hold for the number of years of mentoring experience.

Age

Years

Univ (N=207)
Non-Univ (N=48)

Gender

Female
Male

percentage of respondents

Univ (N=146)
Non-Univ (N=48)

Ethnicity

White
Asian
Latino/Hispanic
Black/African American
Native Hawaiian/ Pacific Islander
Other

percentage of respondents

Univ (N=206)
Non-Univ (N=48)

Experience as mentor (total # teams advised)

Between 1 and 3 teams
Between 4 and 10 teams
More than 10 teams

Percentage of respondents

Univ (N=207)
Non-Univ (N=55)

How many teams have your mentored?

Experience as mentor (total # years in the program)

Between 1 and 2 years
Between 3 and 5 years
More than 5 years

Percentage of respondents

Univ (N=206)
Non-Univ (N=55)

For how many years have you participated in this mentoring program?

Many mentors have extensive entrepreneurial experience, both in terms of the number of ventures they have co-founded, and in terms of the ventures they supported as a board member or investor. Further, university mentors who are venture capitalists (VCs) and individual investors have been involved in more deals compared to the non-university sample. Further, mentors come from widely diverse industries.

Entrepreneurial experience

Univ (Smallest N=26)
Non-Univ (Smallest N=48)

Industry

Univ (N=205)
Non-Univ (N=48)

Question: In what industry do you work? (Digital includes Computer hardware, computer, software digital health, e-commerce/internet. Materials & processes includes Chemicals and materials, Clean tech, Energy generation, Energy, storage, Food and agriculture. Biotech includes health therapeutics and medical devices)

Most mentors are experts in bringing product to market (including strategic planning, marketing, developing a business plan) and not in the more quantitative/product development related activities, such as R&D and financial analysis. Mentors have diverse learning goals, but most are interested in learning entrepreneurship-specific content (e.g., equity investment, IP strategy) rather than about the processes of mentoring and coaching. This would be interesting to explore in further research.

Mentor expertise

Univ (Smallest N=207)
Non-Univ (Smallest N=48)

Please rate your own expertise in each of the following areas relative to senior people in firms in the industry that your mentees' venture is targeting/operating in. (0: no expertise, 10: a lot of expertise)

Mentor learning

Univ (N=220)
Non-Univ (N=55)

Question: What would you like to learn the most through your mentorship community? Rank each alternative (Top choice is plotted)

Expectations and content of mentor/mentee interactions

In both university and non-university programs approximately 70% mentors report completing an orientation/training session together with their mentees. The average evaluation of the usefulness of the training session was 7/10 (Likert scale) in both university and non-university samples. Further, most mentors do not take an economic interest in the mentee's venture during the program (82% in the non-university sample, 93% in the university sample).

When asked about their motivation to support entrepreneurs, mentors often name factors related to general reciprocity (giving back) and contributing to something. For example, a mentor stated, "I've been there, done that and feel an obligation (and consider it a privilege) to support the next generation of entrepreneurs". Another mentor stated that he wanted "to help the next generation of entrepreneurs solve problems with technology". Another mentor mentioned that he wanted "to help younger entrepreneurs, particularly women, achieve success and develop self-confidence in their leadership". Few mentors cite professional reasons, such as finding talent or investment opportunities (Though such responses are slightly more frequent among the non-university mentors). Another theme is the presence of relevance and staying connected as important factors for mentors. One mentor stated that he "hoped [his] guidance could help newbie entrepreneurs overcome their knowledge and cognitive barriers to success". Another mentor mentioned that he wanted "to help unlock the potential of ideas to reach commercial success through [his] own business experience". Additionally, a mentor stated that he "was interested in learning from the young minds that are coming up with innovative ideas". Another mentor stated that he wanted to stay "plugged into the emerging entrepreneur community… to stay on top of what is going on". For more illustrative quotes, please see Appendix C. These two categories were not named by mentees who mainly believe that mentors are driven by reciprocity.

Further, mentors offer different forms of support, ranging from advice and personal and professional development to providing network opportunities (introduction to partners, customers or investors). Again, the latter is more common among the non-university mentors. In most cases, even when both mentor and mentee intend to have a mentoring relationship, their work begins as an advising or coaching relationship.   Some professionals who are asked to mentor may only advice or coach throughout the engagement, either because they don't intend to truly mentor their mentee on her/his entrepreneurial journey (or don't know how) or the mentee does not want the professional in that role either because their chemistry is off or the mentee does not feel that he/she needs a mentor or believes that other people they work with meet their mentoring needs.
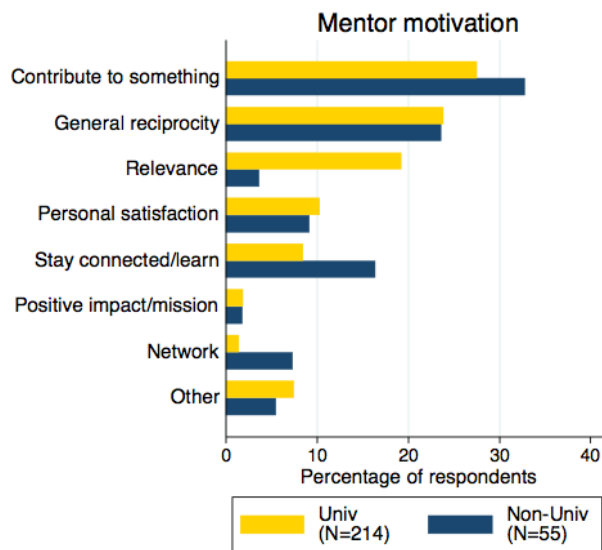
Mentor motivation — What is the primary motivation for you to participate as a mentor? (Enter text)

Univ (N=214) / Non-Univ (N=55)
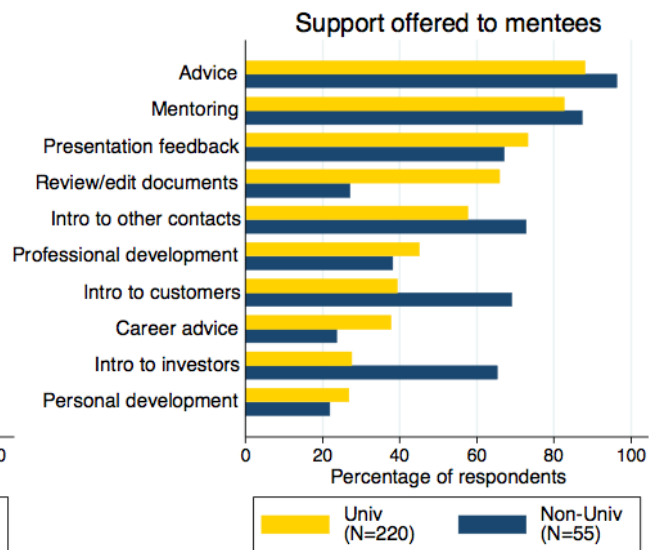
Support offered to mentees — Question: Types of support you have provided to your mentee(s) in this program. (check all that apply).

Univ (N=220) / Non-Univ (N=55)

Success factors – Mentors' evaluation of the program

Evaluation of mentoring success. We asked mentors three questions highlighting different aspects of mentoring success: (1) whether they were utilized effectively by their mentees, (2) whether they enjoyed a high-quality relationship, and (3) whether reciprocal learning took place. On average mentors rated their utilization by mentees as 6.1 (out of 10 on Likert scale), their relationship as 7.0 (out of 10), and the reciprocal learning as 6.9 (out of 10). We found that the three measures were highly correlated at ($r > 0.45$, $p = 0.000$). This suggests that all three aspects are important to mentors and that none should be neglected when designing mentoring programs. Further, we found that university and non-university mentors did not differ in their responses to each of these questions.

Gender, age, experience. Age and gender have no effects on the mentor's evaluation of the mentor/mentee relationship or of the extent to which they were able to learn from each other. In contrast, more experienced mentors (in terms of the number of teams they have supervised) report higher levels of mutual learning ($r = 0.15, p = 0.016$).

Growth mindset (of mentor). Similar to the growth mindset results in the mentee sample, mentors who believe that most skills needed for being a successful entrepreneur can be developed and learned, evaluate the program more positively, compared to those who believe that skills related to entrepreneurship are fixed and cannot be improved significantly. However, the relationship is weaker than in the mentee sample ($r = -0.155, p = 0.01$).

Growth mindset and evaluation of mutual learning between mentor/mentee
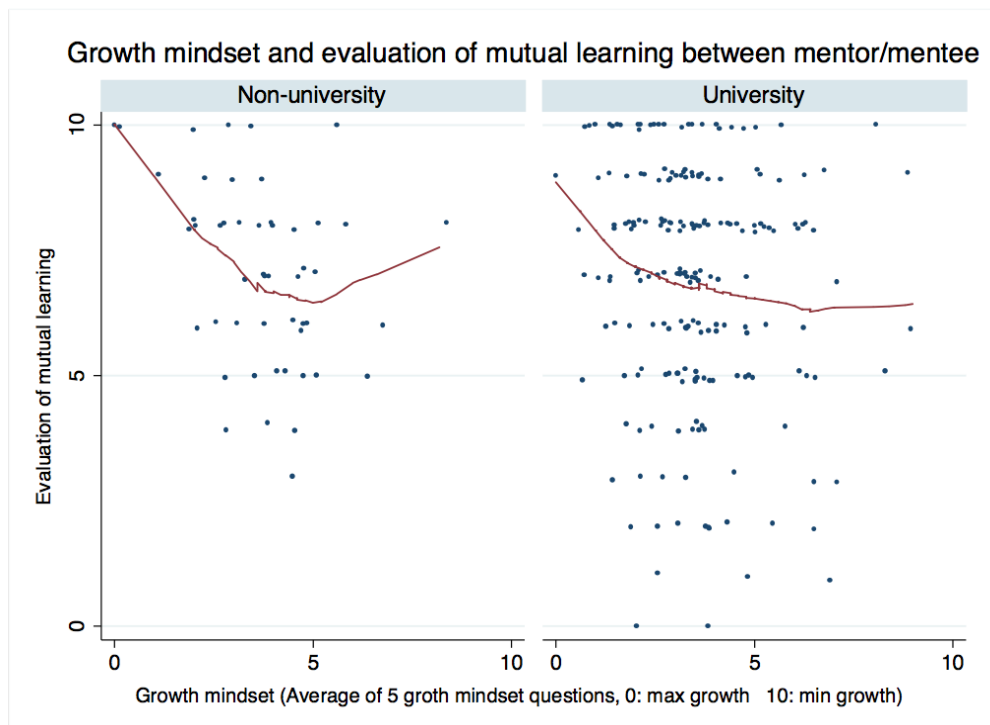
Matching. Mentors who were able to talk with a few potential mentees prior to making a commitment report a higher quality of the mentoring relationship (Rank sum test, $p = 0.060$) and greater learning ($p = 0.013$) compared to other matching procedures. The remaining matching procedures do not exhibit significant differences. Matching based upon interviews is difficult and time-consuming to arrange in a university schedule context, therefore very rare in university programs compared to non-university programs.

Mentor-mentee training. The presence of an orientation session did not affect mentors' evaluations of their relationship with the mentees or of the extent to which they were able to learn from the program.

25

Approach to mentoring. Individual mentors report different approaches to mentoring, from "active listening" to more active involvement into the business activities. However, there are no substantial differences in reported outcomes among mentors with different approaches.

Further, some mentors report that they were able to evaluate mentoring progress by, e.g. noticing signs of learning, or by contributing to the team's reaching specific milestones such as the first prototype or customer. Further, our data suggest that mentors who report that mentoring progress cannot be measured, also show generally lower learning rates (Rank sum test, $p = 0.037$), with the mentor/mentee relationship ($p = 0.037$) and with their usefulness of the mentoring for the mentee ($p = 0.001$).

Gender issues in entrepreneurship. The majority of mentors are concerned about gender issues in entrepreneurship. The issues and solutions they invoke are diverse, but there is consensus regarding the need for greater awareness about gender issues, including support from mentors. For example, mentors stated that women's success can be enhanced with encouragement and access to dedicated mentors. For more illustrative quotes, please see Appendix C.

What can enhance women's success?

Question: In your experience, what is the top factor that can enhance the success for women working on entrepreneurial projects? (Enter text)
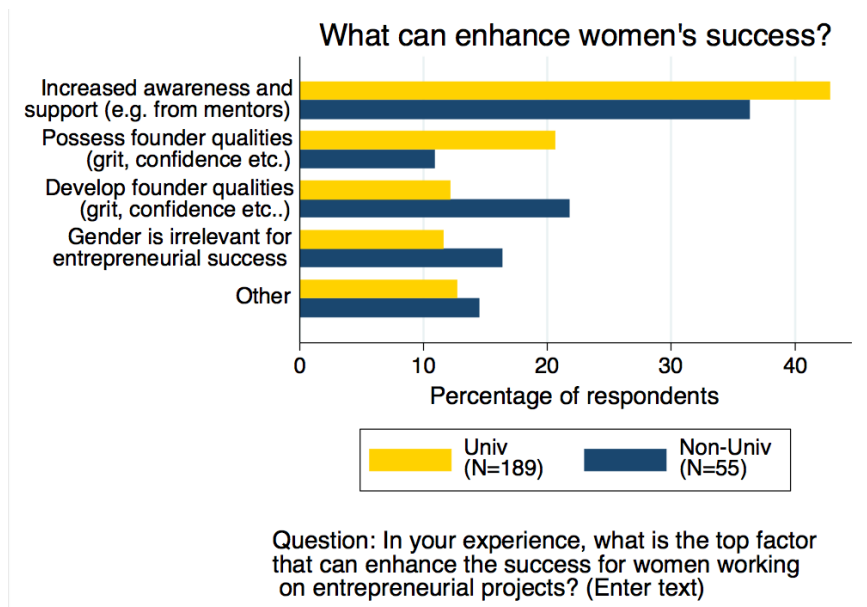
5. Discussion

This is one of the first accounts of the success factors of entrepreneurial mentoring programs. We conducted a large-scale survey of 33 entrepreneurial programs in the United States, collecting mentor, mentee and administrator perspectives on their mentoring program structure and experiences. Our findings confirm some and challenge several other conventional

assumptions in entrepreneurship, while also introducing several testable hypotheses for future research.

The findings show that mentoring is fundamental to founder education, yet the delivery of effective mentoring programs can be significantly improved, particularly at universities. Generally, effective methods of mentor recruiting, selection, training, matching and management are lacking. While non-university processes are better, mentoring in both settings is limited in many ways. Universities often have weak institutional support for non-academic programs, like mentoring, and therefore underinvest in them, financially and culturally. Non-university programs invest more because they understand that strong mentoring is key to the success of their portfolio companies and is fundamental to their organizations' positioning in their ecosystems. Silicon Valley or any other thriving entrepreneurial ecosystem would not be what they are, without informal and formal mentoring networks.

Training and mentor education is an issue across the board. Apart from basic mentor and founder orientations offered by about half of the programs, programs don't educate their mentor-mentee pairs on how and why to develop relationships and mentoring approaches that give them the perspective, mindset and tools to thrive.

Formal structure of mentoring

Our data indicate that the formal structure of mentoring has both direct and indirect effects on the evaluation of learning and on mentee satisfaction with the program. In particular, formal training is associated with improved mentee satisfaction with the program. Further, more interactions between mentor and mentee are associated with better program evaluations. This is particularly true for personal and video communication between mentors and mentees (and less so for email interactions). In contrast, having a prize or a competition component does not improve program evaluation, even for teams winning the contest. These results suggest that programs should focus more on enabling closer collaboration between mentee and mentor than on setting up competitive incentives for entrepreneurial teams. One cost-effective way to improve collaboration may be for programs to invest in better online systems and resources (that are currently limited in many programs) to facilitate better matching and more productive exchange between the parties.

Mentees

Our data reinforce that diversity remains an important issue in entrepreneurship. Women constitute only 20% of the sample in both university and non-university samples. Further, mentee background is substantially less diverse in non-university programs compared to university programs, particularly in terms of ethnicity and educational background of the respondents. We also find that approximately half of the mentees have entrepreneurs in their families, and that this

connection is particularly high in the non-university data. This suggests that many prospective entrepreneurs coming from a non-traditional background may be discouraged from pursuing their own independent ventures. While our data does not provide any direct evidence of the mechanisms underlying these diversity issues, greater investment in mentoring could make entrepreneurship a more viable career choice. Mentors with entrepreneurial backgrounds can help non-traditional entrepreneurs understand their journey and gain the confidence to take the risk to grow a venture. Mentoring could help offset the advantage that founders with entrepreneurial family members have, compared to others who do not.

Further, our data present consistent evidence that mentees with a growth mindset (i.e., those who believe that successful entrepreneurs have skills that can be developed and learned) are more satisfied with the mentoring and with the entrepreneurial program more broadly. Entrepreneurial programs are therefore advised to seek growth mindset as a marker of desirable personality in mentees, and to instill the growth mindset, e.g. through introductory mentoring training and regular program reminders and tips.

Mentors

There are two important parallels between mentor and mentee responses. First, just as mentees, mentors exhibit a positive link between growth mindset (i.e., believing that successful entrepreneurs have skills that can be developed and learned) and program evaluation, reinforcing the theme that the growth mindset is an important personality marker of mentoring success, and an indicator of positive collaboration outcomes. For example, mentees were more satisfied with mentors who focused their mentoring on asking questions and encouraging reflection rather than providing specific advice. Second, as for mentors, mentors who actively participated in mentor-mentee matching report greater satisfaction with the program. This result suggests that programs may benefit from giving mentors and mentees an important voice in the matching process as opposed to unilaterally imposing the match.

Mentor data suggest that mentors can add more value to biotech and consumer goods startups compared to those in to the digital sector. This can have two possible explanations. One possibility is that there are fewer mentors available who are capable of providing useful advice for digital startups. Another possibility is that digital startups require less institutional knowledge and are therefore less dependent on mentor experience and advice relative to other industries. While we cannot separate between these explanations with the survey data, our findings suggest that entrepreneurial programs should be aware of this distinction.

Differences between mentee and mentor perspectives

What is an ideal mentor?
(Respondents: mentors)

An ideal mentor does not give information directly but asks questions	
An ideal mentor provides specific actionable advice	
An ideal mentor does not expect economic benefits in return	
An ideal mentor invests in building a mentoring relationship	

Univ (N=214) Non-Univ (N=55)

Question: What is an ideal mentor?
(0: Strongly disagree 10: Strongly agree)

What is an ideal mentor?
(Respondents: mentees)

Univ (N=437) Non-Univ (N=46)

Question: What is an ideal mentor?
(0: Strongly disagree 10: Strongly agree)

The comparisons of mentee and mentor perspectives on what makes a good mentor suggest that these are largely aligned. Mentors and mentees both care greatly about building a high-quality mentoring relationship. However, mentors (particularly in the university sample) consider it more important to ask questions instead of giving specific information, whereas mentees value specific information more. That is, mentors believe that an indirect approach with probing questions may be more effective in creating successful founders. Further our data suggest that mentees who value the indirect approach more and who demand less specific advice are more satisfied with the mentoring program. Taking together these results suggest that investing resources into mentees' mindsets regarding mentorship is important for program success. It may help mentees understand the value of a mentor who contributes to mentee growth via asking questions rather than giving direct advice.

Differences between university and non-university programs

Lastly, our findings suggest that non-university programs are ahead of university programs along several important dimensions. First, non-university programs provide more advanced formal processes and training. This includes online systems and tools to support the mentoring relationship, a protocol for removing undesirable mentors, and the wider use of post-program assessment of outcomes. Second, university programs feature fewer interactions between mentors and mentees. This lower intensity of interactions may result from a lack of motivation of the mentee to get mentoring (because they may not be that serious about starting a business), poor mentor-mentee fit, or from a lack of support by the program (e.g., insufficient training and/or tips/reminders). Further, our data show that non-university programs are able to attract more experienced mentors, which may lead to more productive collaboration, relative to university programs.

In terms of the mentoring content, non-university mentees report that one of the most value-adding activities by the mentor are introductions to potential customers, suppliers, investors and

partners. Some mentors are what the literature refers to as "super connectors." In contrast, the network of the mentor is a minor factor for mentees in the university data suggesting that those mentees may not utilize their mentors effectively. These results suggest that university program administrators may be able to improve program success by expanding the role of the mentor, for example by encouraging mentors to enable connections between their mentees and their professional network. Because giving a connection presents more risk to a mentor, universities should provide the context around this activity that encourages mentors to help students who want and will follow up with connections to ask for a connections help in the context of student learning, rather than for a commercial purpose, while is the context in a non-university setting.

6. Future Directions

In addition to revealing several interesting patterns our report generates novel hypotheses and raises questions for future work and research. How can organizations give mentees and/or mentors more voice in the matching process? What role can training play to help develop the growth mindset of mentees and mentors to improve their learning and increase venture performance? How can we help make the mentor and mentee pool more diverse? Should mentors focus more on enlarging the professional network of their mentees or on sharing their entrepreneurial and personal experience with the mentees? Our report opens a window into some of the relevant factors driving the answers to these questions.

Some of our findings can be implemented now. For example, many of these lessons learned can be shared by creating a community of practice, starting with this study's 33 public and private research partners. An online database would make it easier for the entrepreneurial community to engage more qualified mentors and manage mentoring programs including allowing improved matching. A half-day training program to help mentees and mentors develop mindsets and apply mentoring best practices from this study would be a resource that would allow hundreds of organizations and thousands of mentees and mentors to improve their work.

What are opportunities for future research to address new questions and uncertainty in our study?

First, our findings derive mainly from introspection and from self-reported data. Some of the relationships suggested by our data can be tested in more controlled environments enabling more accurate recommendations to entrepreneurs and program administrators. For example, we may be able to better understand the relevant factors in mentor-mentee matching by randomly assigning different matching procedures to different teams. While not part of this survey, our experience tells us that the "coachability" of entrepreneurs is a trait that may be a factor in success. Studying specific mentee and mentor pairs would give us insight into how mentors teach entrepreneurs to be coachable and how mentors may offer better support to mentees who are coachable. Another interesting question is how mentors are catalysts for the expansion of entrepreneurs' high-quality network connections.

Further, our data does not use employment data or financial indicators of venture performance. An important future direction is the execution of longitudinal studies of startup performance over time, starting with surveying graduates of accelerator programs and ending in collecting valuation (and eventually IPO or acquisition) data on "graduated" companies. Future research may benefit from using teams as a supplemental unit of analysis. This may allow more precise statements about the demographic and educational fit between the mentee and mentor forming the team, as well as the comparison of their evaluation of the success factors. An interesting dynamic that looking at the team as a unit would reveal is if and how mentors as well as their network become involved with the teams economically over time. (e.g., as employees, investors, consultants, customers, and partners).

One of the important questions for universities in particular, is how can organizations help mentors and coaches be better integrated into their training and educational programs so that their work more effectively is leveraged to achieve learning and educational objectives for founders? What are the issues in making this happen and how can they be overcome?

Appendix A. Coding scheme for qualitative responses.

Program Administrators

Mentor's approach to mentorship

Active listening. Definition: Mentor listens, asks questions, and seeks to understand what the mentee wants. Samples responses: I like to listen to the entrepreneur's vision for the company, try to get the students to articulate why they want to start a business, I like to ask a lot of questions

Offer solutions. Definition: Mentor offers solutions (broadly defined) to mentee. Samples responses: Guide and use own experiences to show the team how to improve, focus on growing the company and the individual, simply offer feedback

Procedural/regularity. Definition: Mentor describes what procedures they have in place or how they establish regularity. Samples responses: Weekly meetings, short office hours or periodic in person meetings, interaction with the mentee on a repeated basis

Establishing trust/emotional support. Definition: Mentor establishes trust and offers emotional support. Samples responses: Spending time in person to first confirm chemistry, I enjoy finding out first who my audience is, first step is to establish a trusting connection

What reasons could create a cause to remove a mentor?

Inappropriate behavior. Definition: Mentor demonstrates inappropriate behavior (broadly defined). Samples responses: A mentor wanting to take advantage of the mentee in any way or acting unprofessional and against best practices, unbecoming behavior, conflict of interest

Bad fit with mentee. Definition: There is a bad fit (broadly defined) between the mentee and the mentor. Samples responses: Lack of chemistry with a specific team, not adding value

Lack of engagement/availability. Definition: Mentor demonstrates a lack of engagement or lack of availability. Sample responses: Lack of availability and/or follow-through, lack of participation, not being responsive to the team

Is there a protocol for removing a mentor?

Talk with mentor. Definition: Program administrators talk with mentor. Samples responses: Talk with and notify mentor of an issue, sit down with mentor and explain the situation and keep the mentees away from the conversation

Don't invite mentor back. Definition: Program administrators do not invite mentor back. Samples responses: We simply don't invite them back, if they are not valuable to the founders we do not invite them back

No formal protocol. Definition: Program administrators do not have a formal protocol for removing a mentor. Samples responses: There hasn't been a need to this point for us to intervene in the process, not formally

Mentees

College major of mentees

Technical/natural sciences. Definition: The mentee pursued a technical or natural sciences major. Samples responses: Physics, Computer Science, Medicine

Social sciences/humanities. Definition: The mentee pursued a social sciences or humanities major. Samples responses: Economics, English, History

Business. Definition: The mentee pursued a business major. Samples responses: BBA, MBA

Stage of project at time of mentoring.

Concept/idea. Definition: Mentee had a concept or idea at the time of mentoring. Samples responses: Concept, it was only an idea, just a good idea

Fund-seeking. Definition: Mentee was seeking funds at the time of mentoring. Samples responses: Pre-seed, prefunding

Funded. Definition: Mentee had funding at the time of mentoring. Samples responses: Pre-revenue company, seed stage, grant funded stage

Market. Definition: Mentee had taken their startup to market at the time of mentoring. Samples responses: Post revenue

HOW can entrepreneurial mentors provide specific help?

Feedback. Definition: Mentors offer feedback. Samples responses: They provided much needed, review ideas and give feedback on documents such as business plans, gave great feedback on pitch deck and business model

Resources. Definition: Mentors offer resources (broadly defined). Samples responses: Majority of our mentors help by providing resources, they provided us plenty materials and sources that help to have a deep understanding of the industry

Network. Definition: Mentors provide mentees with connections and introductions that can assist with their business. Samples responses: Introductions to investors and customers, linked to other people who were key to achieving fundamental goals, they help connect us to the people in the area that can answer our specific questions about the industry we are trying to enter

Guidance. Definition: Mentors offer advice and information to help mentees with their startup. Samples responses: They help navigate the space they're experienced with, they really kept us on a consistent game plan, mentors have offered excellent advice about generally applicable strategies for improving a business that would be obvious to an experienced entrepreneur

Social-emotional support. Definition: Mentors offer social-emotional support. Samples responses: They gave me inspiration to deviate from the path of least resistance.

Personal insights/advice. Definition: Mentors offer insights and advice from their personal experience. Samples responses: Their experience is very helpful as it speeds up the learning curve on what best practices are in addition to helping anticipate risks and challenges, the most valuable part of the experience was learning from those who have already been through this

WHY do entrepreneurial take the time to help?

General reciprocity. Definition: Mentors want to give back. Samples responses: Their motivation is primarily giving back to the community, they want to help us with our entrepreneurial dreams, entrepreneurial mentors take the time to support students such as myself because they want to impart their infinite knowledge and wisdom upon us lowly students

Relevance. Definition: Mentors have relevant experience that will benefit mentees. Samples responses: The real word experience with startups is something one can't gain through coursework or case studies and mentors therefore play a vital role of filling this void, most of them have started small businesses or worked in the early phases of entrepreneurial ventures

Contribute to something. Definition: Mentors want to contribute to something. Samples responses: It gives them the ability to be part of something special without paying the full price of doing it themselves, they want to see our success and help us improve, they want to see big challenges tackled successfully

Network. Definition: Mentors want to expand their networks and stay connected to the entrepreneurial community. Samples responses: To network with up and coming entrepreneurs, it keeps them engaged with entrepreneurial pursuits, they increase their network of contacts

Positive impact/mission. Definition: Mentors to have a positive impact; Mentors have a mission. Samples responses: I feel they intrinsically believe that entrepreneurship is a way to shape the society in general and country at large, to help better communities around the world by supporting young entrepreneurs

Personal satisfaction. Definition: Mentors enjoy working with startups. Samples responses: They find it exciting to work with startups, I think they have a contagious passion for innovation and creativity, personal fulfillment

Mentors

Mentor motivation

General reciprocity. Definition: Mentor wanted to give back. Samples responses: To help out new entrepreneurs, pay it forward, it is my duty as an entrepreneur to cascade my information down to those that need it

Relevance. Definition: Mentor believed that they have relevant experiences to share. Samples responses: Helping other entrepreneurs learn from my experiences so they can succeed, I hoped that my guidance could help newbie entrepreneurs overcome their knowledge and cognitive barriers to success, help unlock the potential of ideas to reach commercial success through my own business experience

Contribute to something. Definition: Mentors wanted to contribute to something. Samples responses: Support entrepreneurial efforts, help students be successful entrepreneurs, to bring leading edge technology to commercial realization

Network. Definition: Mentors wanted to make new connections to learn and who can be valuable in their careers. Samples responses: I like to meet and have meaningful interaction with entrepreneurs in my community, to meet smart motivated people, networking with other professionals

Positive impact/mission. Definition: Mentors wanted to have a positive impact; Mentors had a mission. Samples responses: To grow the regional startup base which will improve the regional economy and generate cultural and financial benefits to all, I am committed to coaching founders of new ventures towards creation of profitable new businesses which add value to our US economy

Personal satisfaction. Definition: Mentors enjoyed participating in the program. Samples responses: I feel it's a productive, stimulating, and rewarding use of my time, I enjoy helping young bright minds succeed in business, nothing is more satisfying than helping and seeing smart motivated people become successful in their business endeavors

Stay connected/learn. Definition: Mentors wanted to stay connected to the entrepreneurial community and continue learning. Samples responses: To keep myself plugged into the emerging entrepreneur community, I was interested in learning from the young minds that are coming up with the innovative ideas and sharing, to stay active

What can enhance women's success?

Possess founder qualities. Definition: The qualities of the woman enhance her success. Samples responses: Confidence and the ability to show it, determination, passion for solving a problem

Develop founder qualities. Definition: The knowledge and skills of the woman the enhance her success. Samples responses: Intelligence, leadership skills, industry knowledge

Increased awareness and support. Definition: Women need to be aware of potential challenges and require support. Samples responses: More access to women entrepreneurial mentors, building relationships, opportunity to try

Gender is irrelevant for entrepreneurial success. Definition: Gender does not dictate someone's success. Samples responses: No difference between men and women nowadays, no different than men, don't treat them any differently than a man in the same position

Appendix B. Data tables

B1. Program Administrators Data Tables

Who are the mentors? (Indicate the share of each category, % of respondents)	University (n=20)	Non-University (n=18)	Total (n=38)
Experienced entrepreneur	44.6	40.8	42.8
Non-entrepreneur, business person	15.8	17.6	16.6
Non-entrepreneur, subject matter expert	7.3	15.4	11.1
Non-entrepreneur, investor	6.4	13.3	9.7
Faculty member	5.9	2.5	4.3
University staff	12.4	6.8	9.8
Other	7.8	3.9	5.9
Total	100	100	100

Value proposition of mentoring to mentors (choose all that apply, % of respondents)	University (n=19)	Non-University (n=16)	Total (n=35)
Staying in touch w field	73.7	75	74.3
Giving back	78.9	6.3	45.7
Learning from students	36.8	6.3	22.9
Returning a favor	36.8	43.8	40
Financial compensation	10.5	6.3	8.6
Recognition	68.4	81.3	74.3
Free invitation to events	26.3	56.3	40
Other	5.3	6.3	5.7

Value proposition of mentoring to mentees *(0: not important, 10: important)*	University (n=19)	Non-University (n=14)	Total (n=33)
Improve mentee's experience and learning	8.8	9.9	9.3
Serve as discriminator from other programs	4.3	5.9	5
Attract mentees to engage with program	7.4	7.9	7.6
Improve startup performance (e.g. funding, market entry)	8.1	7.7	7.9

How are mentors recruited? *(0: not at all, 10: predominantly)*	University (n=18)	Non-University (n=14)	Total (n=32)
Referrals from existing mentors	5.8	7.3	6.4
Alums	5.8	6.7	6.2
Applications to become mentor	3.6	3	3.3

What are the qualities for choosing mentors? (0: min, 10: max)	University (n=18)	Non-University (n=14)	Total (n=32)
Empathetic	6.3	8.5	7.3
Trustworthy	8.7	9	8.8
Good listener	7.7	8.1	7.9
Listener	8.2	6.2	7.3
Positive	7.6	5.7	6.8
Patient	7.3	7.4	7.3
Direct/blunt	3.6	4.1	3.8
Extraverted	5.8	6.6	6.2
Critical	6.9	4.4	5.8
Self-disciplined	7.6	6.6	7.2
Open to new experiences	5.4	5.4	5.4
Warm	5.8	4.1	5
Organized	5.1	4.6	4.9
Calm	5.3	6.4	5.8

How are mentors and mentees matched? (choose one, % of respondents)	University (n=16)	Non-University (n=7)	Total (n=23)
Mentors select mentees	25	0	17.4
Mentors submit preferences	25	0	17.4
Mutual selection by mentors and mentees	6.3	57.1	21.7
Program matches	43.8	42.9	43.5
Total	100	100	100

What are mentees and mentors matched on? (check all that apply, % of respondents)	University (n=16)	Non-University (n=8)	Total (n=24)
Relevant expertise	87.5	75	83.3
Demographic similarity	18.8	12.5	16.7
Geographic proximity	25	12.5	20.8
Reputation of mentor and stage of venture	50	37.5	45.8
Age	0	12.5	4.2
Gender	12.5	12.5	12.5
Other	6.3	25	12.5

What kind of online systems are used to support/manage the mentoring process? (check all that apply, percentage of respondents)	University (n=16)	Non-University (n=14)	Total (n=30)
Mentor applications/screening	18.8	28.6	23.3
Mentor matching	6.3	21.4	13.3
Mentee/Mentor management and communication	43.8	35.7	40
System for mentees to contact mentors	31.3	21.4	26.7
No system	62.5	50	56.7

Does program conduct post-program assessment? (Choose one, % of respondents)	University (n=18)	Non-University (n=14)	Total (n=32)
Yes, both mentees and mentors	27.8	85.7	53.1
Mentees only	22.2	7.1	15.6
Mentors only	11.1	0	6.3
No	38.9	7.1	25

Is there a protocol for removing a mentor? (Choose one, % of respondents)	University (n=15)	Non-University (n=13)	Total (n=28)
Talk with mentor	40	38.5	39.3
Don't invite mentor back	6.7	7.7	7.1
No formal protocol	53.3	53.8	53.6
Other	100	100	100

What reasons could create a cause to remove a mentor? (Choose one, % of respondents)	University (n=17)	Non-University (n=12)	Total (n=29)
Inappropriate behavior	17.6	0	10.3
Bad fit with mentee	5.9	25	13.8
Lack of engagement/availability	58.8	41.7	51.7
Other	17.6	33.3	24.1
Total	100	100	100

B2. Mentee Data Tables

Age (Years)	University (n=368)	Non-University (n=35)	Total (n=403)
Age	28.6	30.5	28.8

Gender (% of respondents)	University (n=367)	Non-University (n=35)	Total (n=402)
Male	79.8	80	79.9
Female	20.2	20	20.1
Total	100	100	100

Ethnicity (% of respondents)	University (n=366)	Non-University (n=35)	Total (n=401)
White	53.6	80	55.9
Black/African American	5.7	2.9	5.5
American Indian/Alaska Native	0.8	0	0.7
Asian	28.1	14.3	26.9
Native Hawaiian/Pacific Islander	0.3	0	0.2
Latino/Hispanic	4.9	0	4.5
Other	6.6	2.9	6.2
Total	100	100	100

College major of mentee (% of respondents)	University (n=339)	Non-University (n=32)	Total (n=371)
Technical (Sciences, Engineering, Mathematics)	46.6	46.9	46.6
Social sciences and humanities	21.5	12.5	20.8
Business	31.9	40.6	32.6
Total	100	100	100

Industry (% of respondents)	University (n=364)	Non-University (n=34)	Total (n=398)
Digital	35.7	32.4	35.4
Materials and processes	14.6	20.6	15.1
Biotech	19.8	23.5	20.1
Consumer goods	7.1	2.9	6.8
Other	22.8	20.6	22.6
Total	100	100	100

Stage of project at time of mentoring (Enter text, % of respondents)	University (n=104)	Non-University (n=23)	Total (n=127)
Idea/Project	72.1	26.1	63.8
Seeking funding	7.7	39.1	13.4
Funded	17.3	34.8	20.5
Post market entry/Funded	2.9	0	2.4
Total	100	100	100

Frequency of contact between mentor/mentee (0: min, 10: max)	University (n=341)	Non-University (n=41)	Total (n=382)
Face-to-face meetings	7.1	6.9	7.1
Phone/video meetings per month	3.3	4.2	3.4
Email interactions per month	6.6	9.4	6.9

Mentor's involvement (0: min, 10: max)	University (n=359)	Non-University (n=40)	Total (n=399)
Sustained and active involvement in the project/business	5.7	5	5.6
Reviewing documents (business plan, pitch deck)	6.3	6.3	6.3
Introduction to investors	3.5	5.3	3.7
Introduction to suppliers	2.9	3.3	2.9
Introduction to customers	3.7	4.1	3.7
Introduction to partners	4	5	4.1

Matching approach used by the program *(Choose one, % of respondents)*	University (n=367)	Non-University (n=41)	Total (n=408)
The program matched the mentor to me	65.7	48.8	64
I chose my mentor from a few options provided by the program	19.6	19.5	19.6
I talked with a few potential mentors and then I asked one of the mentors to work with me	11.4	12.2	11.5
I chose my mentor from a larger cohort of mentors	6.5	29.3	8.8
My mentor chose me	7.9	31.7	10.3
Total	100	100	100

Matching approach preferred by mentee *(Choose one, % of respondents)*	University (n=371)	Non-University (n=41)	Total (n=412)
The program matched the mentor to me	18.3	4.9	17
I chose my mentor from a few options provided by the program	23.5	24.4	23.5
I talked with a few potential mentors and then I asked one of the mentors to work with me	37.2	34.1	36.9
I chose my mentor from a larger cohort of mentors	7.5	19.5	8.7
My mentor chose me	13.5	17.1	13.8
Total	100	100	100

HOW can entrepreneurial mentors provide specific help?
(Enter text, % of respondents)

	University (n=387)	Non-University (n=45)	Total (n=432)
General reciprocity	3.6	4.4	3.7
Relevance	5.7	6.7	5.8
Contribute to something	5.2	20	6.7
Network	67.4	44.4	65
Positive impact/mission	1.8	0	1.6
Personal satisfaction	2.8	0	2.5
Other	13.4	24.4	14.6
Total	100	100	100

WHY do entrepreneurial mentors take the time to help?
(Enter text, % of respondents)

	University (n=387)	Non-University (n=45)	Total (n=432)
General reciprocity	59.8	63.6	60
Relevance	1.1	0	1.1
Contribute to something	7.3	0	6.8
Network	3.4	9.1	3.7
Positive impact/mission	5	9.1	5.3
Personal satisfaction	13.4	0	12.6
Other	10.1	18.2	10.5
Total	100	100	100

How did your mentor contribute to your venture's success? (Enter text, % of respondents)	University (n=245)	Non-University (n=32)	Total (n=277)
Experience	6.6	3.4	6.1
Guidance	60.7	41.4	58
Network	13.7	27.6	15.6
Feedback	8.2	10.3	8.5
Emotional support	3.8	6.9	4.2
Nothing (Not happy with mentor)	5.5	10.3	6.1
Other	1.6	0	1.4
Total	100	100	100

What contributed to the effectiveness of your mentorship? (Enter text, % of respondents)	University (n=245)	Non-University (n=32)	Total (n=277)
Background/experience of mentor	11	12.5	11.2
Connections	1.6	3.1	1.8
Fit between mentee and mentor	40.4	28.1	39
Regular communication/program structure	32.2	50	34.3
Other	14.7	6.3	13.7
Total	100	100	100

B3. Mentor Data Tables

Age	University (n=146)	Non-University (n=48)	Total (n=194)
Age	53.3	44.6	51.1

Gender (% of respondents)	University (n=146)	Non-University (n=48)	Total (n=194)
Female	15.1	12.5	14.4
Male	84.9	87.5	85.6
Total	100	100	100

Ethnicity (% of respondents)	University (n=146)	Non-University (n=48)	Total (n=194)
White	83.2	87.5	84.3
Black/African American	0.7	6.3	2.1
Asian	9.8	0	7.3
Native Hawaiian/Pacific Islander	0.7	0	0.5
Latino/Hispanic	2.1	2.1	2.1
Other	3.5	4.2	3.7
Total	100	100	100

Entrepreneurial experience (number of ventures)	University (n=205)	Non-University (n=48)	Total (n=253)
How many entrepreneurial ventures have you co-founded or co-founded	2.9	2.1	2.8
How many entrepreneurial ventures have you served on as CEO or senior executive?	2.8	2.6	2.7
How many ventures have you raised money for?	3.6	3.5	3.6
If you are a venture capitalist, how many deals have you been involved in funding?	14.5	7.2	9.8
How many of the companies that you have been involved in as founder, co-founder, CEO or venture capitalist have achieved IPO or been acquired?	3.3	2.5	3

Industry (% of respondents)	University (n=205)	Non-University (n=48)	Total (n=253)
Digital	22.9	37.5	25.7
Materials and processes	18.5	0	15
Biotech	30.7	0	24.9
Consumer goods	13.7	0	11.1
Other	14.1	62.5	23.3
Total	100	100	100

Experience as mentor (total # of teams advised)	University (n=207)	Non-University (n=55)	Total (n=262)
Between 1 and 3 teams	62.3	36.4	56.9
Between 4 and 10 teams	24.6	52.7	30.5
More than 10 teams	13	10.9	12.6
Total	100	100	100

Experience as mentor (total # of years in the program)	University (n=207)	Non-University (n=55)	Total (n=262)
Between 1 and 2 years	70.9	70.9	70.9
Between 3 and 5 years	20.9	25.5	21.8
More than 5 years	8.3	3.6	7.3
Total	100	100	100

Mentor expertise (% of respondents)	University (n=188)	Non-University (n=48)	Total (n=236)
R & D	5.7	5.8	5.7
General management	7.8	8	7.9
Strategic planning	7.9	8.2	8
Developing a business plan	7.9	8	7.9
Marketing	6.7	6.8	6.7
Business development	7.4	7.8	7.5
Financial analysis	6.1	6	6.1
Financing	5.6	6.2	5.7

Mentor learning	University (n=207)	Non-University (n=48)	Total (n=255)
Mentoring theory and practice	2.6	2.4	2.6
Coaching theory and practice	3	3	3
Leadership development theory and practices	2.5	2.8	2.6
Specific topics about entrepreneurship and innovation (e.g., investing, finance, lean startups, technology insight and development, IP strategy, founder leadership development)	2.3	2.3	2.3
None of the above	4.6	4.6	4.6
Total	100	100	100

Mentor motivation (Enter text, % of respondents)	University (n=206)	Non-University (n=55)	Total (n=261)
General reciprocity	23.9	23.6	23.8
Relevance	27.8	32.7	28.8
Contribute to something	27.8	32.7	28.8
Network	1.5	7.3	2.7
Positive impact/mission	2	1.8	1.9
Personal satisfaction	10.7	9.1	10.4
Stay connected/learn	8.8	16.4	10.4
Other	7.8	5.5	7.3
Total	100	100	100

Support offered to mentees (Choose all that apply, % of respondents)	University (n=206)	Non-University (n=55)	Total (n=261)
Advice	93.2	96.4	93.9
Mentoring	87.4	87.3	87.4
Introductions to investors	29.1	65.5	36.8
Introductions to potential customers	42.2	69.1	47.9
Introductions to other contacts	61.7	72.7	64
Career advice	39.8	23.6	36.4
Presentation practice and feedback	77.2	67.3	75.1
Review and editing documents	69.9	27.3	60.9
Personal development	28.2	21.8	26.8
Professional development	47.1	38.2	45.2

What can enhance women's success? (Enter text, % of respondents)	University (n=189)	Non-University (n=55)	Total (n=244)
Possess founder qualities	20.6	10.9	18.4
Develop founder qualities (confidence, grit, etc..)	12.2	21.8	14.3
Increased awareness and support (e.g. from mentors)	42.9	36.4	41.4
Gender is irrelevant for entrepreneurial success	11.6	16.4	12.7
Other	12.7	14.5	13.1
Total	100	100	100

Appendix C. Additional quotes

The most sought-after qualities in mentors across samples are being trustworthy, empathetic, direct, and being a good listener. When looking at the mentor data it is evident that the program administrators chose mentors that valued these qualities. When asked about their approach to mentorship, mentors stated:

- Making the connection (chemistry, bonding) and getting to know each person and their team's dynamics is of first importance. Genuinely caring about who they are individually and as a team builds a strong relationship
- I prefer to use the EDGE method – explain, demonstrate, guide, and empower – with the goal of teaching the mentee how to do the work for themselves through a guided example
- I like to ask a lot of questions of the founders
- I like the format where I do a lot of listening in an effort to find problems, weaknesses, and lack of knowledge
- Listen carefully, ask questions

There are many reasons to remove a mentor, but the most frequent ones are lack of engagement, as well as inappropriate behavior (broadly defined). Some examples of these reasons include:

- Conflict of interest, soliciting, non-professional behavior, not making best effort of notifying us of problem, and ineffective communication
- Lack of chemistry with a specific team

When describing how mentors can help university and non-university mentees often name "guidance" as the most important factor. For example:

- Our latest mentor was both a great asset and dear friend to our team. He continually encouraged us, challenged us, and fought for your success. Whenever we had needs, he would find the resources we required
- Whenever you feel lost – a pretty common feeling among entrepreneurs – mentors provide guidance based on their experience. I would say that getting you in the right direction is the most helpful thing they do
- Mentors have offered excellent advice about generally applicable strategies for improving a business that would not be obvious to an inexperienced entrepreneur

In addition, non-university mentees often refer to the mentor's network and connection as being helpful.

- Linked [us] to other people who were key to achieving fundamental goals
- They have been able to connect me with specialists/experienced professionals on nearly any topic I need assistance with
- They help connect us to the people in the area that can answer our specific questions about the industry we are trying to enter

When asked about the mentors' motivation to participate in the program most respondents think that mentors want to give back to their community or to struggling entrepreneurs.

- Almost all mentors in this field have at one point felt the drive and passion to make something for themselves and go off the beaten path to pursue their passion. Obviously this journey is fraught with challenges… Having encountered these roadblocks themselves, or perhaps even overcoming them, they have tools to offer and desire to give back, and help the next generation of entrepreneurs on this track to success
- Their motivation is primarily giving back to the community. Mentors were once in our shoes and most likely either wished they had help, or did get help, so this is a way to give back
- I believe the mentors take the time to support us because they want to give back by teaching the new generation of entrepreneurs

Different from the non-university sample, university mentees also think that mentors derive personal satisfaction from being able to help.

- I think entrepreneurial mentors like to learn
- It's intellectually stimulating and rewarding to critique a new business/technology

When asked about their motivation to support entrepreneurs, mentors often name factors related to general reciprocity (giving back) and contributing to something.

- It's my duty as an entrepreneur to cascade my information down to those that need it
- To give back the mentoring that I received along my journey of launching and scaling businesses

Another theme is the presence of relevance and staying connected as important factors for mentors.

- I am interested in sharing my experience with young entrepreneurs to help with the development of innovative healthcare related technologies… It is rewarding to play an active role in the development process
- To be abreast of current technology
- To feel plugged in, to help out entrepreneurs in any way I can and for my own intellectual stimulation

The majority of mentors are concerned about gender issues in entrepreneurship. The issues and solutions they invoke are diverse, but the dominant theme is the need for more awareness about gender issues, including support from mentors.

- To stop thinking they're women working on entrepreneurial projects, they're just entrepreneurs
- Women must see [other women] in entrepreneurial roles

Appendix D. Participating organizations

Universities	Non-Universities
City University of New York	Barclays Accelerator powered by Techstars
Columbia University	iCatalysts Accelerator
Georgia Institute of Technology	Techstars Anywhere
Harvard University	Techstars Boston Accelerator
Louisiana State University	Techstars Detroit
Michigan Technological University	Techstars Kansas City
New Jersey Institute of Technology	Techstars Mobility
New York University	Techstars Music
Northwestern University	Techstars Retail
Oregon State University	
Princeton University	
Purdue University	
Rice University	
San Diego State University	
University of Alabama	
University of Chicago	
University of Illinois, Urbana-Champaign	
University of Michigan	
University of Minnesota-Twin Cities	
University of Pennsylvania	
University of South Florida	
University of Toledo	
University of Wisconsin-Milwaukee	
Wichita State University	

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