DEVELOPMENT AND ASSESSMENT OF SELF-AGENCY AND THE ABILITY TO INNOVATE AND TAKE RISKS

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The point is not to vocationalize the arts, but rather to empower students in the artistic disciplines to understand the creative possibilities that exist in entrepreneurship.[1]

Faculty and archivists will collaborate on the development of courses in which students will actively engage in the interpretation and constructive use of multi-perspective, primary sources. Students will also learn to systematically organize digital tools as "research instruments" for managing their engagement with primary sources.[2]

Student and area entrepreneurs have three options for participation: consultations, design jams, or the clinic model itself. By offering a suite of services, we will be enabling students to apprentice with advanced students and experts, regardless of skill level, and to build multiple opportunities to suit the dynamic real-world needs of our community.[3]

These are just three examples of projects funded by the Transforming Learning for the Third Century (TLTC) initiative that seek to promote students' self-agency and their ability to innovate and take risks. The Provost Task Teams on Engaged Learning and Digital Instruction define this learning goal as follows: "Students must know how to observe the opportunities and capacities of human communities, understand where new or existing ideas or systems could bring value within those communities, and be able to act effectively in order to drive sustained and positive change to provide that value" (Third Century Initiative Student Learning, http://thirdcentury.umich.edu/student-learning/).

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[1] Mark Clague and Melissa Levine, "Arts Lab: Bringing Entrepreneurial Skills to Students in the Arts at the University of Michigan." TLTC grant, funded 2013.

[2] Terrence McDonald and Nancy Bartlett, "Engaging the Archives: New Partnerships and Understandings of Teaching and Learning with Primary Sources." TLTC grant, funded 2015.

[3] Nancy Benovich Gilby and Emily Puckett Rodgers, "UMSI Design Clinic: Social Media and User Experience." TLTC grant, funded 2014.

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This paper begins by defining the interrelated concepts of self-agency, innovation, and risk-taking. After discussing the relevance of these capacities for student development, effective approaches to fostering them will be offered. The paper concludes with a selection of appropriate measures for assessing these outcomes.

Definition

Self-agency refers to the sense of ownership and autonomy students have towards their education. To enable instructors to best support and design the environment in which students can develop these capacities, the next section describes how self-agency and the ability to innovate and take risks have been conceptualized in the literature. This section explores these concepts individually, then presents a brief discussion of how the three capacities are interrelated.

Self-Agency

Self-agency refers to students exercising choice in their learning experiences and selecting opportunities based on a long-term conception of their own goals for intellectual, professional, and personal growth. This implies that students should be able to engage in constructing their own knowledge and assume responsibility for their own learning, which is better known in the education research literature as self-authorship. Self-authorship originally stemmed from Kegan's (1982, 1994) theory of self-evolution, which "traces the emergence of increasingly complex forms of meaning making during adolescence and adulthood" (Baxter Magolda & King, 2012, p.11).

Following Kegan, Baxter Magolda studied adults from ages 18 to 43 for nearly 30 years and conceptualized self-authorship as a continuum. At one end of the continuum are those who rely on *external* influences for meaning making (i.e., mental construction of one's beliefs, identity, and social relations by way of personal experiences). At the other end of the continuum are those who have developed *self-authorship*, the internal capacity to construct and rely on their own meaning making. In the middle of the continuum (where most young adults are situated) are those at a *crossroads* (Barber & King, 2014; Barber, King, & Baxter Magolda, 2013; Baxter Magolda & King, 2012). This crossroads is often a source of tension, as individuals grapple with negotiating between external and internal formulas for meaning making (Baxter Magolda, 2008). These three phases are not linear milestones; instead one's position on the continuum is context-dependent and can evolve in a complex and cyclical manner. That is, a student might demonstrate a capacity for self-authoring one aspect of her life and still heavily rely on external meaning-making structures in other aspects. These three milestones are described in Figure 1.
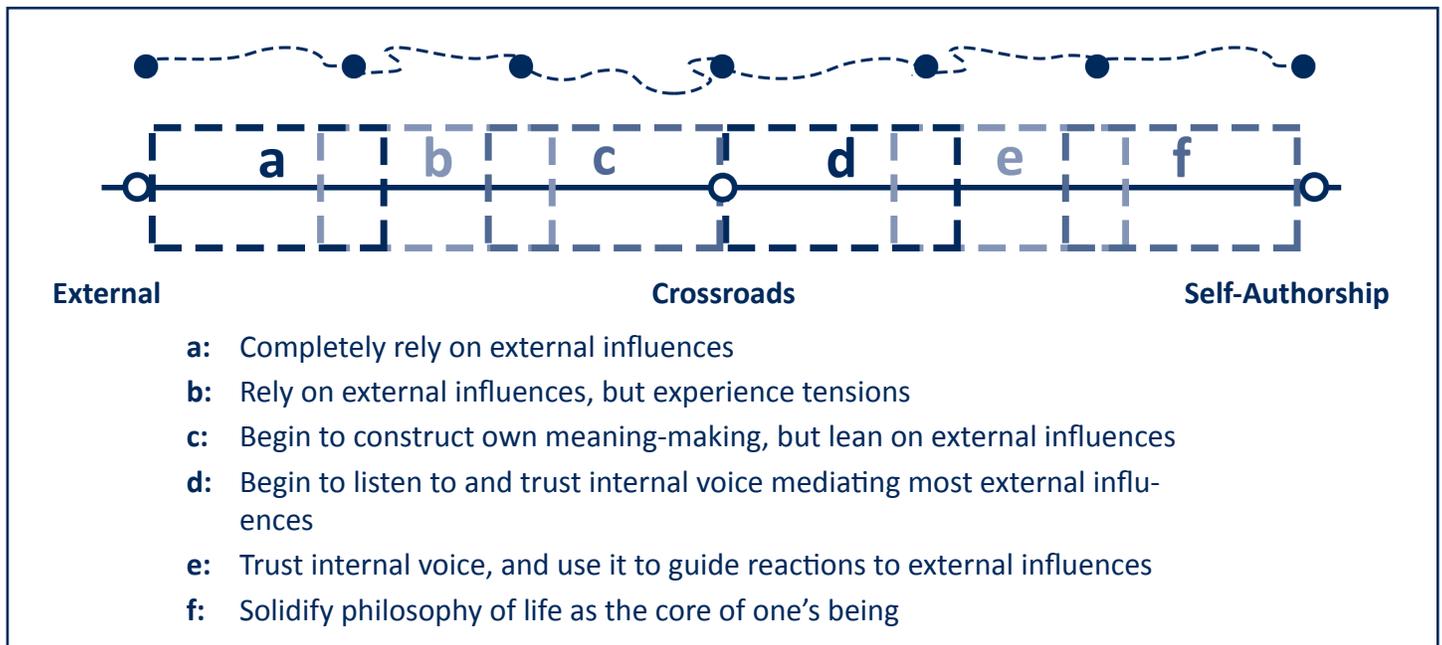
The Ability to Innovate

As discussed in a separate Occasional Paper (Hallman, Wright, & Conger, 2016), the ability to innovate is closely related to, but still distinct from, creativity. Whereas creativity is "the production of novel and useful ideas in any domain," innovation is "the successful implementation of creative ideas within

Figure 1. Development of Self-Authorship (adapted from Baxter Magolda, King, Taylor, & Wakefield, 2012)

External   **Crossroads**   **Self-Authorship**

a: Completely rely on external influences

b: Rely on external influences, but experience tensions

c: Begin to construct own meaning-making, but lean on external influences

d: Begin to listen to and trust internal voice mediating most external influences

e: Trust internal voice, and use it to guide reactions to external influences

f: Solidify philosophy of life as the core of one's being

an organization" (Amabile, Conti, Coon, Lazenby, & Herron, 1996, p. 2). Risk-taking is a key precursor for innovation.

The Ability to Take Risks

Failure or rejection are the biggest risks associated with opportunities for innovation (Tahirsylaj, 2012, p. 265). Successful innovation entails a tolerance for failure and a propensity towards risk (Egan, 2005; Moberg et al., 2014; Sandeen & Hutchinson, 2010; Tahirsylaj). The literature on entrepreneurship, a leading field of research on risk-taking, considers "risk propensity" and "taking calculated risky actions in uncertain environments" to be important elements for educational initiatives to help students develop entrepreneurial mindsets (Moborg et al., p. 15).

Opportunities to explore, experiment, and discover can be particularly difficult for students with financial constraints or cultural backgrounds that do not afford the same safety nets as more privileged students. Encouraging students to practice risk-taking in an academic setting requires safe space for exploration, as well as transparent efforts to minimize significant consequences. More support (i.e., mentoring, learning resources, or financial aid) can help all students take academic leaps and manage their mistakes (Busteed, 2015). Guide students towards embracing failures,

because failures serve to help students build the knowledge and experience needed for developing creativity and innovation (Stoller, 2013).

Interrelationship of Capacities

Simply stated, the interrelationship of these three capacities can be summarized as self-agency supporting the ability to innovate and take risks (McLean, 2005; Oldham & Cummings, 1996; West, 2014). Believing in one's autonomy and ability to take action promotes intrinsic motivation and, consequently, innovation (West, 2014). Successful innovation seldom happens without the drive and perseverance that can only come from intrinsic motivation to pursue a particular challenge (Amabile, 1998; Oldham & Cumming, 1996; Seelig, 2015). Another way to understand how self-agency, innovation, and risk-taking interrelate is through this description of entrepreneurial skills: "proactiveness; innovativeness in problem definition and problem solutions; and the capacity for taking responsibility for one's own choices" (Moberg et al., 2014, p. 7). In this example, self-agency is represented through proactiveness and responsibility and is foundational to innovation.

Examples of these three capacities in practice at University of Michigan are the TLTC-funded *Block M Records* and the *Star Spangled Banner Labs* led

by Mark Clague and Melissa Levine. These creative-arts-based labs "empower students in the artistic disciplines to understand the creative possibilities that exist in entrepreneurship and provide a counterpart in the humanities for the kind of support Tech Transfer provides more generally for the sciences." Students collaborate on creative-arts-based entrepreneurial projects, referred to as "labs," and participate in workshops, seminars, and mini-clinics that address topics such as copyright law and business fundamentals relevant to the creative arts. These labs provide students with opportunities to practice self-agency, innovation, and risk-taking by allowing them to think and act like entrepreneurs while working on real-world projects. *Block M Records* is a label that supports the U-M faculty, staff, and students through distribution of recordings. In the *Block M Records Lab*, students learn about intellectual property policies, recommend promotion and distribution models, develop content licensing schemes, and propose new models to encourage participation with the record label. Students working in the *Star Spangled Banner Lab* develop business models, create licensing schemes, engage in licensing and contract negotiations, draft contracts, research funding models, shape a public relations strategy, and prepare intellectual property procedures for managing crowd-sourced content. Through experiential learning, students are able to practice self-agency, innovation, and risk-taking in an authentic learning environment relevant to the students' disciplinary focus.

Why Are Self-Agency and the Ability to Innovate and Take Risks Important?

Self-agency and the ability to innovate and take risks are important skills to develop and hone during a U-M education. A strong sense of self-agency positively impacts identity development and helps students meet their academic, personal, or professional goals (Baxter Magolda et al., 2012; King, Baxter Magolda, Barber, Brown & Lindsay, 2009). Students with limited self-agency are likely to make difficult decisions, such as which major to choose, based on others' opinions rather than reflecting on their own personal or professional goals. The development of self-agency in university students is also crucial for post-graduation success, as "a necessary prerequisite to be able to genuinely engage different opinions and to make complex life choices" (Creamer, Baxter Magolda, & Yue, 2010, p. 550).

Results from the 2015 University of Michigan Asks You (UMAY) student survey suggest that U-M students are not fully developing their sense of self-agency. For example, out of all undergraduate students who participated in the survey (N ≈ 5,000):

- About a quarter of students (24.21%) choose a major based on parental/family desires.
- Over two-fifths (41.26%) of students do not think it is easy to identify their own academic and intellectual strengths and interests.

The ability to innovate is also increasingly important for graduating university students in nearly any discipline (Council on Competitiveness, 2005). Innovation skills give students an edge within a modern and global marketplace (Duderstadt, Taggart, & Weber, 2008; Genco, Hölttä-Otto, & Seepersad, 2012). Since innovation develops through an extended process of taking risks and failing, it is imperative for U-M students to have opportunities to practice these skills and develop perseverance and tenacity (Egan, 2005).

One way the University of Michigan has addressed the importance of developing these three capacities among students is through *Innovate Blue* (http://innovateblue.umich.edu/). Innovate Blue's vision is to "support both individual creativity and multi-disciplinary teams in tackling the world's most pressing challenges and opportunities, taking full advantage of an academic and experiential space that promotes exploration and advances entrepreneurial innovation." Innovate Blue offers courses and programs geared towards encouraging and training students across various academic disciplines as they pursue their diverse goals and ideas. Innovate Blue supports and expands the Michigan entrepreneurial network and community and helps students act on their innovative ideas by connecting them to those networks and communities, such as TechArb (http://cfe.umich.edu/techarb-student-incubator/), an incubator that encourages and empowers student startups and provides a like-minded community for Innovate Blue students. The Innovate Blue Innovation Space provides an easily accessible location in the Shapiro Undergraduate library for students to find

entrepreneurial class advising and a collaborative work and design space that is open 24 hours a day.

Fostering Self-Agency and the Ability to Innovate and Take Risks

Encouraging self-agency does not mean removing all direction or guidance for student learning. In fact, the process is most effective when there are clear goals and expectations. The key is providing informational (rather than controlling) feedback early and often that speaks to students' individual improvement and development (Van Gelderen, 2010). Feedback that supports students' autonomy is not directive, asks more questions about the student's intentions, responds more to student-generated questions, and prompts discussion regarding possible perspectives (Reeve, Bolt, & Cai, 1999).

Evidence-based strategies for fostering self-agency and the ability to innovate and take risks include the following:

- Provide experiential learning opportunities for students to authentically practice skills (Seelig, 2015; Tracey & Phillips, 2007).
- Develop mentorship opportunities, along with guest speakers and/or case studies, for experiential learning; near-peer mentorship helps students understand that they are not alone (Shepherd, 2004).
- Create role-play and simulation exercises that help students practice skills in low-stakes environments (Shepherd, 2004).
- Provide opportunities for reflective practice (such as internal reflection, group discussion, journal writing) to facilitate the process of learning from failure (Hagström & Scheja, 2014). For an example of an approach to encouraging student reflection on failure, see Table 2 in Shepherd (2004, p. 279).
- Support self-agency by removing authoritative structures surrounding elements of work process (i.e., how things are done), while providing big-picture guidance (i.e., set clear goals and expectations) (Hodge, Baxter Magolda, & Haynes, 2009; Van Gelderen, 2010).

At the U-M, optiMize (https://www.optimizemi.org/) emphasizes the development of students' self-agency through their slogan, "Why not me?" A social innovation community, optiMize assists students as they attempt to put their ideas into impactful practice. Although optiMize provides financial support and mentorship opportunities, they maintain and foster self-agency by requiring students to completely manage the decision-making and procedural aspects of their projects. The questions, "How do I do this?" and "When should I do it by?"—traditionally answered by faculty or instructors—are questions students need to answer themselves. Previous students who have completed optiMize projects serve as mentors, and these relationships provide students with indirect knowledge of failure, as they hear from experienced students and other optiMize alumni about their previous experiences.

A classroom-based U-M example is Gameful Assessment At Michigan (GAME), a TLTC project that uses the GradeCraft learning management system (http://digitaleducation.umich.edu/dei/gradecraft/) to promote a gameful approach to learning. GradeCraft allows students to follow different pathways through courses, selecting assignments that interest or challenge them. GradeCraft courses typically incorporate many assignment choices and permit students to submit their work multiple times, decreasing the risk of not doing well on any given task. The result is an environment in which students are more likely to learn and grow from their failures.

Assessing Self-Agency and the Ability to Innovate and Take Risks

This section highlights some of the established instruments and strategies used to assess self-agency, the ability to innovate, and risk taking. To capture the inherent complexities and layers of these three capacities, we recommend that each be evaluated by concurrently using a combination of the suggested instruments and strategies. For additional assistance developing an assessment plan, please see this web resource for an overview: http://crlt.umich.edu/assessment/planning and contact crltassessment@umich.edu for a tailored consultation.

Table 1. Assessment Strategies for Self-Agency

Instrument	Measure	Notes	Measure Type
Self-Portraits (Welkener & Baxter Magolda, 2014)	Self-authorship development	Free-writing exercise, self-portrait, and interview; participants asked to describe themselves, the role(s) others play in their lives, and how they acquire knowledge: *"What elements make you who you are and why are those elements most important to describe you?"*	Direct
Portfolios/ePortfolios (Barrett, 2007; Buyarski & Landis, 2014)	Self-agency Innovation process Risk-taking	Students may self-evaluate through reflective practice: *Self-Assessment and Awareness:* students identify success-related competencies *Goal Setting:* students indicate short and longer-term goals as well as connect personal values and life purpose to the motivation behind their goals *Planning:* students locate programs, information, people, and opportunities to support and reality test their goals	Direct
Self-Authorship Survey (SAS) (Pizzolato, 2007)	Self-authorship development	Validated 24-item instrument for university students, using a 5-point scale (Disagree—Agree). Sample items include: *"I tend to make decisions based on what people I admire think is best, even if it isn't always what I think is best."* *"When I set a goal for myself, I'm pretty sure I'm going to be able to achieve it."*	Indirect
Career Decision Making Survey – Self-Authorship (CDMS-SA) (Creamer et al., 2010)	Self-authorship development	Validated 18-item instrument for university students, but not yet validated for pretest/posttest outcomes, using a 4-point scale (Disagree—Agree). Sample items include: *"The most important role of an effective career counselor or advisor is to be an expert on a variety of career options."* *"In my opinion, the most important role of an effective counselor or advisor is to direct students to information that will help them to make a decision on their own."*	Indirect

Direct measures *are associated with student output and represent actual student learning such as performance on the design of a creative product. In addition, measures within the scope of direct assessment can be further categorized into authentic or other direct measures. Authentic measures demonstrate classroom learning via performance on open-ended tasks, such as the projects completed by students in "Bringing Entrepreneurial Skills to Students in the Arts at the University of Michigan" (see footnote 1 on p. 1 and p. 4). Other types of direct measures demonstrate learning via performance on closed-ended and possibly standardized tasks, such as taking a quiz testing content knowledge. While authentic measures provide a richer understanding of student learning and its applicability to the real world, they can be more time intensive and costly to quantify for purposes of student comparisons. Conversely, other direct measures are usually standardized and easily quantifiable, but may fail to capture the extent to which students are able to apply what they have learned, especially for the unscripted nature of engaged learning.* *Indirect measures* *are associated with students' attitudes, opinions, or reported learning, such as responding to a survey asking whether they agree with statements thought to represent agency or innovative thinking. The use of both direct and indirect measures is recommended for the best understanding of student learning and experiences.*

Self-Agency Measures

Individual interviews are the leading method for measuring self-agency development (Baxter Magolda & King, 2007; Creamer & Laughlin, 2005; Pizzolato, 2003; Torres & Hernandez, 2007, as cited in Creamer et al., 2010). These interviews typically include conversations with participants and use questions that solicit descriptions of significant experiences. Questions include *"What was the best/worst about that? Why do you think you reacted that way?* and *Tell more about how that felt for you?"* (Baxter Magolda & King, 2012, p. 31). An intriguing take on qualitative assessments of self-agency has students create self-portraits, along with a free-writing exercise and an interview, in order to understand students' development (Welkener and Baxter Magolda, 2014). Portfolios (collections of student work over time that demonstrate students' abilities to monitor and reflect on their work), including electronic portfolios, also have significant potential for directly measuring students' self-agency development, innovation process, and risk-taking (Buyarski and Landis, 2014; Maki, 2002).

Qualitative data such as interview results discussed above have been the leading source for assessing self-authorship because "an effective assessment needs to explore the conditions under which particular meaning-making structures are used and whether they reflect functional or optimal levels" (Baxter Magolda & King, 2013, p. 24-25). Qualitative instruments, however, can be time intensive, and often require interviewer training. In recent years, researchers developed quantitative assessment instruments for self-agency (Creamer et al., 2010; Pizzolato, 2007). These instruments are based on the decades-long qualitative work and findings of Kegan, Baxter Magolda, King, and others. Table 1 briefly describes the qualitative and quantitative instruments discussed in this section.

Measures of the Ability to Innovate

There are both direct and indirect measures of the capacity to innovate. Direct measures focus on the outcome of an innovation (product or process), whereas indirect measures focus on the external supporting characteristics of innovation (work/learning environment or behavioral characteristics).

Direct measures include product originality and feasibility, which have been measured by the Five-point Originality Metric and the Feasibility Flowchart, respectively (Genco et al., 2012). The creative thinking process can also be directly measured, for example, using the Creative Thinking VALUE Rubric. Indirect measures include support for innovation, which has been measured using the KEYS instrument that gauges respondents' perceptions of how well organizational climate supports innovation (Amabile et al., 1996). Creative self-efficacy is also a positive predictor of innovation and has been used as another indirect measure (Bandura, 1997). The Assessment Tools and Indicators for Entrepreneurship Education (ASTEE), used to survey participants in entrepreneurship educational initiatives throughout Europe, gauges the learning progress of students and the influence of teaching methods. The strategies and instruments discussed in this section are listed in Table 2.

Risk Propensity Measures

There are currently more extensive choices of indirect measures of risk propensity (Risk Propensity Scale, RPS), but fewer direct measures of risk behavior (Balloon Analogue Risk Task, BART). The RPS instrument is a self-reported survey instrument where participants agree or disagree with statements pertaining to risk propensity. The BART instrument is a computer simulation that measures how one behaves when presented with a risky, yet potentially rewarding, situation. Both instruments are briefly discussed in Table 3.

Conclusion

Self-agency and the ability to innovate and take risks are important for University of Michigan students' academic and post-graduation success. This learning goal encapsulates three distinct and complex skills, while embracing the interrelationship of all. Interventions that foster self-agency will likely foster innovation and risk-taking, and vice-versa. Discussions with faculty and scholars from across U-M during a CRLT-Vice Provost's Office event on fostering and assessing self-agency and innovation made it clear that faculty hope to encourage students' innate sense of discovery, and hope students experiment and explore. However, they

Table 2. Assessment Strategies for Innovation

Instrument	Measure	Notes	Measure Type
Five-point Originality Metric (Genco et al., 2012)	Product – Originality	Score 0-10 given by a reviewer *0 = Common* *2.5 = Somewhat Interesting* *5 = Interesting* *7.5 = Very Interesting* *10 = Innovative*	Direct
Feasibility Flowchart (Genco et al., 2012)	Product – Feasibility	Score 0-10 given by a reviewer; 3-level flowchart *Q1. Is it technically feasible?* *(no = 0; yes = Q2)* *Q2. Is it technically difficult for the context?* *(no = Q3; yes = 4)* *Q3. Is it an existing solution?* *(no = 7; yes = 10)*	Direct
Creative Thinking VALUE Rubric (AACU; Rhodes, 2010)	Process – Creative thinking	Score 0–4 given by a reviewer, on various dimensions related to creative thinking such as taking risks, solving problems and innovative thinking. *0 = Does not meet benchmark* *1 = Benchmark* *2 & 3 = Milestones* *4 = Capstone*	Direct
KEYS: Assessing the Climate for Creativity (Amabile et al. 1996)	Support for innovation	Validated 78-item survey for workplace settings, using a 4-point scale (Never—Always). Sample items include: *"People are encouraged to solve problems creatively in this organization."* *"I have the freedom to decide how I am going to carry out my projects."* *"Generally, I can get the resources I need for my work."*	Indirect
Creative Self-Efficacy Scale (Chen, Gully, & Eden, 2001)	Creative self-efficacy	Validated 8-item instrument for undergraduate students, using a 5-point scale (Strongly Disagree—Strongly Agree). Sample items include: *"I will be able to achieve most of the goals that I have set for myself in a creative way."* *"I am confident that I can perform creatively on many different tasks."*	Indirect

also noted that many students consider risk-taking and failure (an essential part of innovative discovery) unacceptable and uncomfortable. We must foster curricular and co-curricular environments that empower and encourage students to explore without inhibition. There are already several opportunities on campus for students to practice and develop these three capacities. As more opportunities are designed and implemented, it is important to consider assessing how these interventions influence student development so that we can learn more about specific approaches that are efective for U-M students.

Table 3. Assessment Strategies for Risk-Taking

Instrument	Measure	Notes	Measure Type
Risk Propensity Scale (RPS) (Meertens & Lion, 2008)	Risk propensity (general risk taking behavior)	Validated 7-item instrument for university students. Total number of items = 7; scale from 1(totally agree) to 9 (totally disagree): *"I prefer to avoid risks."* *"I usually view risks as a challenge."*	Indirect
Balloon Analogue Risk Task (BART) (Hunt, Hopko, Bare, Lejuez, & Robinson, 2005)	Risk behavior	Validated for university students. Using a computerized tool, participants are asked to inflate a balloon on the computer screen. Each click that inflates the balloon accrues $0.05 in a bank visible on the screen. Participants are free to "collect the money" at any point, until the balloon pops, at which point all money accrued goes back to $0.00 and a new balloon appears. Participants get 10 balloons, and the total amount of money collected is reported at the end.	Direct

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