

Backwoods Brewing Company: Learning to Tolerate Ambiguity

[ELIZABETH A. COOPER](#)

University of Rhode Island

[ELIZABETH McCREA](#)

Penn State Great Valley

[KRISTIN BACKHAUS](#)

State University of New York at New Paltz

Backwoods Brewing Company is an experiential exercise that provides a challenging, reality based business situation, requiring students to create a conclusion based on limited information. It is designed primarily for upper-division management students. A tolerance for ambiguity scale is administered; the debriefing of the exercise helps students develop a better understanding of their tolerance for ambiguity and teaches them some concrete tools to be used when dealing with ambiguity.

Keywords: Tolerance for ambiguity, Experiential exercise, Creativity

The pace of change in the world around us is increasing, requiring more creative decisions based on less information. Tolerance for ambiguity has been listed as a critical characteristic for a successful manager (Thompson, 2003). Unfortunately, students often demonstrate difficulty in managing ambiguous situations, demanding exacting details about assignments and seeking one, clear, “right” answer for every question. To be prepared for a chaotic business world, students need experience in making decisions with limited information, allowing them to exercise their creativity.

Budner (1962) defines the ability to tolerate ambiguity as an individual's propensity to view ambiguous situations as either threatening or desirable. He defines ambiguous situations in three ways. First, an ambiguous situation may be one that is completely new, with no familiar cues. But an ambiguous situation may also be one that is highly complex, or one that is contradictory (Budner, 1962). Over the years, tolerance for ambiguity has been associated with important facets of management including decision-making, learning, and creativity.

Studies have shown that tolerance for ambiguity affects decisions in many areas of management. First, in the area of bank loan determinations, loan officers with lower tolerance for ambiguity tend to be less likely to lend money, and when they do, it is at a higher interest rate (Tsui, 1993; Davidson and Wright, 2001). Similarly, financial market decisions that are based on assessments of risk are found to be affected by the investors' tolerance for ambiguity (Mukerji and Tallon, 2001). In the human resources area, a study of selection of temporary employees found that tolerance for ambiguity was inversely related to worker stress levels (Bauer and Truxillo, 2000),

suggesting that tolerance for ambiguity is an important variable when assessing potential employees. Thus, the emphasis on ambiguity in decision-making stems from its relevance for the evaluation of real-life situations (Frisch and Baron, 1988), which is a critical skill our students need to learn and practice.

Second, in addition to decision-making, tolerance for ambiguity impacts learning and performance. In fact, Dawson, (2000) argues that without encountering ambiguous situations, students have not completed their education. Jonassen and Grabowski (1993) conclude that tolerant individuals typically perform well in new and complex learning situations, while intolerant learners tend to avoid or give up when encountering ambiguous situations. In addition, learning to tolerate ambiguity is associated with several positive learning outcomes: It empowers students (Brunson and Vogt, 1996), it reduces anxiety in learning situations (DeRoma, Martin, and Kessler, 2003), and it increases confidence (Ghosh and Ray, 1997).

Third, a significant relationship between tolerance for ambiguity and creativity has been established (Nicotera, Smilowitz, and Pearson, 1990; Tegano, 1990). Although research has not shown a direct causal link between the two, it is clear that ambiguous situations demand creative solutions, and that lower levels of tolerance for ambiguity can lead to reduced levels of creativity, along with stress and anxiety (Furnham and Yazdanpanahi, 1995).

Creativity has been identified as a critical dimension in making organizations successful today (Miller, 1987; Miller, 2000; Robinson and Stern, 1997). In fact, creativity has been declared essential for a business's long-term survival (Robinson and Stern, 1997), and an organization's ability to "promote and guide." Creativity has been identified as business's "greatest challenge" in terms of survival and profitability (Miller, 1987, p. 4). Consequently, creativity is a competence that many organizations consider critical for their employees, and a capability that students need to foster.

Discussion of creativity and the creative process can be found in most texts (see Morehead and Griffin, 2004), yet we are weak in teaching students *how* to be creative. Too often, students are allowed to practice only convergent thinking; they are told to come up with *the* right answer. More time needs to be spent teaching our students divergent thinking, that is, to *be* creative. To foster creativity in the classroom, Driver (2001) suggests allowing time for creative thinking, encouraging sensible risks, allowing mistakes, imagining other viewpoints and rewarding creative ideas and products.

Because, as noted before, tolerance for ambiguity is an essential workplace competency, and because evidence suggests that tolerance for ambiguity can be fostered and developed (Banning, 2003), we developed the following exercise. It provides students with an opportunity to think creatively and to deal with ambiguity in a supportive, instructional environment.

The Exercise

Students face ambiguity every day, but are often unaware of how it impacts their decisions and subsequent actions. This exercise provides a unique forum to understand the concept and the factors that influence how people interpret ambiguous situations. The exercise also provides an

factors that influence how people interpret ambiguous situations. The exercise also provides an instrument that students can use to understand their own personal tolerance for ambiguity and gives them tools that can be used to address ambiguity in both business and personal contexts. The exercise is suitable for use with a broad range of students, but may be best used in upper-division management courses after students have had a wider exposure to management and organizations. Because the exercise is intended to examine issues related to ambiguity and creativity, we believe it is important that performance on the exercise not be graded by the instructor, thus decreasing the likelihood that students will feel hampered or constrained.

Learning Goals

Ambiguity. This exercise is based on an empirical case. Students will see that business facts are often ambiguous and subject to multiple interpretations. It encourages students to think critically about how their “subjective” interpretation of “objective” facts can influence their decisions and subsequent actions. During the debriefing, students will learn concrete tools that can be used when dealing with ambiguous situations.

Creativity. Students will have the opportunity to create a story. There are no parameters or constraints to their stories other than the beginning of the case. Students are encouraged to develop a number of alternatives before deciding on a particular story line.

Self-Awareness. Part of this exercise involves the use of a tolerance for ambiguity self-measure. There are a variety of these instruments, but we recommend the Tolerance for Ambiguity Scale developed by Nutt (1988). Self-assessment helps the students to better understand the concept as well as their own level of tolerance. The debriefing will also help the students to relate their own tolerance level to decision types. The post-exercise questionnaire allows the students to reflect on their own participation level. Again, this may help them relate their reaction to ambiguity to their participation in the exercise.

Preparation and Directions

The instructor should read and be comfortable with the debrief section (presented below) prior to administering the exercise. Additional preparation is not required. If desired, the exercise can follow a discussion of decision-making, but the exercise is not necessary. Students can be instructed to read the exercise before class, if the instructor would like to reduce the amount of class time used. Students can use notebook paper or the back of the exercise handout to record their story.

In-Class Directions

Est. Time	Action
5 minutes	Instructor introduces exercise and defines ambiguity.
5 minutes	Students are divided into small groups of from two to five members. (In very

small classes, students can complete the exercise on their own.)

- 5-10 minutes Students read the case. Instructors can reduce the time needed for the exercise by having the students read it prior to class.
- 10-15 minutes The groups are instructed to discuss the case and then write a few paragraphs to fill in the missing portion of the story. Most groups will need some time to resolve this step, since individual team members will have different ideas on what the partners should do.
- 10-15 minutes Students take and score the ambiguity instrument
- 5-10 minutes Team representatives are asked to share their group’s story ending with the class.
- 15-30 minutes Debriefing and discussion conclude the exercise.

Alternative: Instructors can administer a tolerance for ambiguity scale prior to the case.

Backwoods Brewing Company

Jesse and Paul wanted to start a business and they agreed that the ideal would be to own their own beer company. Paul said, “It just started off as a joke, to start a beer company. We thought it would be cool.” The micro-brewing industry was growing rapidly, yet competition was still somewhat limited, “At that time there were not so many microbrews on the scene. There were a few, but they weren’t as well known as they are today.” Over the course of several years, starting while they were still in college, they incorporated, developed a product and trademark, got all the necessary state and federal licenses, and officially launched Backwoods Brew (see Table 1 for an event timeline).

Table 1
Backwoods Brewing Company Event Timeline

Year (approx.)	Event
1993–1994	Idea for beer company surfaced (50-50 partners)
1994–1995	Regulation research (e.g., licensing requirements, state sales tax regulations) Product development Market testing
March 1995	Incorporation
Late 1997	Granted State and Federal beer distribution licenses
April 1998	First sale – kegs in local bar (Angel Brewing, Desiderata Distribution, and internal sales)
September 1998	Growlers (1-gallon jugs) on retail shelves (Angel Brewing, internal sales, and distribution)

But all of these activities took a long time for a company on a shoestring. Their limited resources meant they couldn't hire accountants or lawyers; they had to learn how to do these things themselves, like incorporating and filling out the licensing paperwork. After they had all the preliminaries complete, Paul noted that the competitive landscape had changed, "By the time we actually got our approvals...there was a real shake-out where the little guys, who were under capitalized, they just folded. Most of the companies like Pete's Wicked Ale and Sam Adams had actually gone public, so they were like the big guys now. They could pretty much push out the little guys. There was just a lot more competition; the retail store shelves were a lot more crowded."

Aware of their limited resources and the high cost of establishing a manufacturing facility, the partners settled on contract brewing as the only feasible alternative. In contract brewing, an established company produces the product using Backwoods' unique formula. Backwoods still handled all sales and distribution. "There was no way we could have started this business if we would have had to finance building a brewery or even leasing space, and putting in equipment. We would not have been able to start this business without having this option," Paul said.

Selecting their contract brewer turned out to be an easy decision. Jesse purchased a guidebook to U.S. micro-brewing establishments, and both partners cold-called *all* brewers in their region. "So we just started calling them, to see who would brew a small batch for us," Paul said. Jesse added, "The reason why it was Angel Brewing Company, was because these were the only brewers at that time who were willing to give us some of their capacity to brew our beer. At that time the micro brew market was going crazy, and none of the brewers could keep up with demand, everything was so good. They were the only brewers that would do it for us."

Angel, located just outside Boston, didn't just brew Backwoods' beer; they really helped the struggling partners. As Paul recalled, "They were willing to do a very small batch, something that most other brewers probably would not be willing to do. They also let us use their kegs at no charge and they let us use their shipper at a minimum cost to get the stuff down to us [in New Jersey]." Thus, with Angel's help Backwoods was up and running. Consumer reaction to the beer was favorable, including a rave review in a microbrew reviewer's webzine. Distribution grew to about 100 retail stores in New Jersey.

The fledgling company continued to grow. It was marginally profitable and cash flow positive, but the firm was still not generating enough cash for the partners to draw salaries. Then the partners found themselves in a dilemma. Jesse recalled, "The formula, for some reason, was not the same that we had given them for the first batch of keg beer. We knew that they had screwed up somewhere along the line, but here we are, basically putting all of our money into these growlers [i.e., 1-gallon jugs]. The product was way more bitter than we would have liked it to have been."

Although this kind of situation would be only a minor glitch in an established firm, for Backwoods, this represented a crisis that could break the company. All of their money was tied up in the inventory and neither partner could invest any additional funds. The question was: What should the partners do? On the one hand Angel, a small company itself, had been very helpful to Backwoods, especially at the beginning. Paul and Jesse knew that many factors, some of which were beyond Angel's control, might have caused the discrepancy. Besides, they were dependent

on Angel's brewing capacity. However, it was also possible that Angel may have deliberately put its own beer in the growlers to save money and effort. Paul and Jesse felt that their unique product was their strongest selling point. They didn't want to ruin their brand image by selling what they considered an inferior product. The partners sat down soon after the problem had been discovered, and brainstormed potential solutions to their predicament.

Exercise

Write a few paragraphs to finish the story with the following sentences:

Paul and Jesse looked at each other. "I hope we made the right decision," Paul said. "Yeah, me, too," Jesse replied, as he turned off the lights and shut the door.

Exercise Debriefing/Teaching Notes

1. Ask your students to tell you the facts in the case and list them on the board or flip chart. The pivotal fact in the story was that the beer did not taste like Paul and Jesse expected. The meaning of this fact, however, is very ambiguous (i.e., subject to multiple interpretations). How a person interprets this fact will influence the decisions he or she makes and the actions pursued.
2. Ask your students to brainstorm alternative explanations for the different tasting beer. What might have caused the problem? How do our attributions affect the possible solutions? How do the solutions to the problem differ based on whether or not we believe Angel deliberately caused the problem?
3. Have a representative from each group (or each individual if you do not use teams) read the completed story. Ask your students to reflect on why they chose to end the story as they did. What factors influenced their decisions? Was it cues from the case? Was it their tolerance for ambiguity as reflected in their instrument score? Was it personal experience? Their personal values? Cultural norms? Other factors?
4. Ask students if the versions written by the other teams surprised them? Why were they surprised?
5. There are three main approaches that can be used to interpret ambiguous situations, which are loosely based on three types of sensemaking described by Weick (1995). In his work, Weick describes how individuals and organizations make sense of what has occurred, and how they structure the unknown. The more ambiguous the situation, the better it is to use more than one of the following approaches:
 - a. *Analytic sensemaking* (Weick calls this "generic" sensemaking): Gather and analyze data to logically interpret the situation. At this level, data is observed in a relatively objective sense.
 - b. *Interactive sensemaking* (Weick calls this "intersubjective" sensemaking): Gather all the people affected and together work out a common, "we-based" interpretation of the situation. The shared understanding of the events emerges through dialogue and negotiation. Reality is created as the focus of the dialogue shifts, until the group extracts a shared meaning from the discussion.

- c. *Intuitive sensemaking* (Weick calls this “intrasubjective” sensemaking): Use personal judgment or “gut-feel” to interpret the situation. Each individual engages in sense-making separately, and uses their prior experiences and intuition to understand the events.
6. In the case of Backwoods, many different and equally suitable approaches would have enabled the partners to interpret the situation including (but not limited to):
 - a. Do consumer testing to see if consumers can detect the difference in the beer and if it matters (analytic sensemaking).
 - b. Dissect the production process to see where the problem arose, who was to blame, and how problems can be prevented in the future (analytic sensemaking).
 - c. Call a meeting of Paul, Jesse, and the Angel employees to discuss face-to-face the problem and devise a mutually agreeable solution (interactive sensemaking).
 - d. Paul and Jesse could just go with their “gut” feel for the situation: Do they trust Angel brewing? Do they feel it was an honest mistake? Or do they feel they are being taken advantage of? (intuitive sensemaking).
7. While students typically suggest a range of outcomes, it is surprising how many students believe that Backwoods Brew should sue Angel Brewing. This is probably a reflection of our litigious society, and thus gives the instructor an important opportunity to discuss this cultural tendency. The instructor can have students critically think through the ramifications of suing, and can encourage them to think of other approaches or solutions that do not rely on the legal system.

In this case, the two companies had a very positive working relationship prior to this incident. Paul and Jesse were still learning the business and would not have wanted to jeopardize this social capital. Besides, who would have brewed their beer in the meantime?

In addition, the partners didn't have enough money to hire a lawyer, let alone pay court costs. No lawyer would have taken the case on speculation either, since the total monetary value of the botched batch was not that big. It was only valuable to Paul and Jesse, since it meant the continuation of their dream. Even if they could afford the legal fees, students should be encouraged to analyze whether this would have been the best use of the partners' very limited resources. Paul and Jesse could have spent the money on marketing, product development, or some other activity that would have improved the business, instead of on nonproductive legal fees.

8. If students want to know the actual outcome of the case, you can share with them the following information. However, because the case is intended to help students approach an ambiguous situation, and develop creative ways of solving it, instructors might not want to share the actual outcome. It is important that students don't feel that their story ending was correct or incorrect. It may be most useful to share the outcome during a later class session, so that they have had time to think more about the meaning of their own decision.

Actual Outcome: In real-life the partners decided not to confront Angel (intuitive sensemaking). Angel brewing had been good to them during the start-up phase and frankly they were dependent on Angel's production capacity. They did however, within one year, move production to a firm located in their home state (New Jersey), which eliminated both the high transportation cost from Boston to New Jersey and their concerns about production consistency. This time they required a written contract with the brewer (they did not have one with Angel) and they put significant emphasis on product quality in its terms.

Student Reactions to Backwoods Brewing

To pilot test the case, we administered it to two groups of undergraduate management students. Sample A was drawn from a university in the Northeast, and Sample B from a comprehensive college in the Northeast. After doing the exercise, students were asked to complete a questionnaire designed to measure the extent to which they enjoyed the exercise, how much they participated and why (see Questionnaire in Appendix). Level of liking and participation were measured using a Likert scale.

Table 2
Results of Tolerance for Ambiguity Scale and Evaluation of Class Exercise

	Mean	SD	Liked	Participation
TFA	46.10	9.67	-0.28**	-0.31**
Liked Exercise	4.78	0.99		0.46**
Participation	4.08	1.02		

** $p < .01$

As can be seen in Table 2, students moderately enjoyed the exercise. Overall mean for the liking scale was 4.78 (SD = .99). Their comments suggested that they liked the fact that the case was “real.” Some students commented that the case made them think about different ideas of how the problem could be solved, which suggests that they recognized the level of creativity involved.

It was not surprising that some students wanted more guidance on how to do the exercise “right.” Some participants repeatedly asked questions about the case, about the specific assignment (such as how much should they write, what should they say, and about what would constitute a “good” answer). The fact that these questions occurred indicates that the exercise taps into the ambiguity concept and thus provides many opportunities to attain and reinforce the learning goals.

In terms of participation levels, compared to other activities they had done in class, students felt that they participated at about the same level (M = 4.08, SD = 1.02). Written comments suggested that their level of participation related to the degree to which they liked the exercise, how comfortable they were with the open-endedness of the assignment, and the other members of their group.

Using the Nutt (1988) Tolerance for Ambiguity scale, the mean score was 46.1 (SD = 9.67). We were interested in the relationship between Tolerance for Ambiguity score and the degree to which students enjoyed the exercise and participated in it. As the correlation matrix in Table 2 suggests, there was a negative relationship between tolerance for ambiguity and liking the exercise, and also between tolerance for ambiguity and participating in the exercise.

Conclusions

It is well recognized in the literature that tolerance for ambiguity is related to success in leadership and management. Yet, students are given few opportunities to become aware of their own level of tolerance for ambiguity, and little chance to develop an appreciation for ambiguous situations and how they can be handled. The purpose of our exercise is to expose students to an ambiguous business situation and allow them to exercise their creativity in solving it. We found that there was a relationship between students' tolerance for ambiguity and their perceived degree of participation and enjoyment in solving an open-ended case.

REFERENCES

- Banning, K. C. (2003). The effect of the case method on tolerance for ambiguity. *Journal of Management Education*, 27, 556–565.
- Bauer, T. N., & Truxillo, D. M. (2000). Temp-to-permanent employees: A longitudinal study of stress and selection success. *Journal of Occupational Health Psychology*, 5, 337–346.
- Brunson, D. A., & Vogt, J. F. (1996). Empowering our students and ourselves: A liberal democratic approach to the communication classroom. *Communication Education*, 45, 73–84.
- Budner, S. (1962). Intolerance of ambiguity as a personality variable. *Journal of Personality*, 30, 29–50.
- Davidson, R. A., & Wright, M. E. (2001). The effect of auditor attestation and tolerance for ambiguity on commercial lending decisions. *Journal of Accountancy*, 191, 89.
- Dawson, R. (2000). Twenty dirty tricks to train software engineers. ACM Proceedings of the 22nd International Conference on Software Engineering. Limerick, Ireland.
- DeRoma, V. M., Martin, K. M., & Kessler, M. L. (2003). The relationship between tolerance for ambiguity and need for course structure. *Journal of Instructional Psychology*, 30, 104–110.
- Driver, M. (2001). Fostering creativity in business education: Developing creative classroom environments to provide students with critical workplace competencies. *Journal of Education for Business*, 77, 28–34.
- Frisch, D., & Baron, J. (1988). Ambiguity and rationality. *Journal of Behavioral Decision Making*, 1, 149–157.
- Furnham, A., & Yazdanpanahi, T. (1995). Personality differences and group versus individual brainstorming. *Personality and Individual Differences*, 19, 73–80.
- Ghosh, D., & Ray, M. R. (1997). Risk, ambiguity, and decision choice: Some additional evidence. *Decision Sciences*, 28, 81–105.
- Jonassen, D. H., & Grabowski, B.,L. (1993). *Handbook of individual differences, learning, and instruction*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Miller, M. (2000). Six elements of corporate creativity. *Credit Union Magazine*, 66, 20–23.
- Miller, W. C. (1987). *The creative edge: Fostering innovation where you work*. New York: Addison-Wesley.
- Morehead, G., & Griffin, R. (2004). *Organizational behavior: Managing people and organizations*. Boston: Houghton Mifflin.
- Mukerji, S., & Tallon, J. (2001). Ambiguity aversion and incompleteness of financial markets. *Review of Economic Studies*, 68, 883–305.
- Nicotera, A. M., Smilowitz, M., & Pearson, J. (1990). Ambiguity tolerance, conflict management style and argumentativeness as predictors of innovativeness. *Communication Research Reports*, 7, 125–131.
- Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of Management Journal*, 39, 1245–1264.
- Nutt, P.C. (1988). The tolerance for ambiguity and decision making. The Ohio State University College of Business Working Paper Series, WP88-291. In D. Marcic, J. Selzter, & P. Vaill (2001). *Organizational behavior: Experiences and cases* 6e. (pp. 227–230). Cincinnati, Ohio: South-Western.

- Robinson, A.G., & Stern, S. (1997). *Corporate creativity: How innovation and improvement actually happen*. San Francisco: Berrett-Koehler.
- Tegano, D.W. (1990). Relationship of tolerance of ambiguity and playfulness to creativity. *Psychological Reports*, 66, 1047–1056.
- Thompson, L. (2003). Improving the creativity of organizational workgroups. *Academy of Management Executive*, 17, 96–103.
- Tsui, J. (1993). Tolerance for ambiguity, uncertainty audit qualifications and bankers' perceptions. *Psychological Reports*, 72, 915–19.
- Weick, K.E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage Publishing.

Elizabeth A. Cooper, Ph.D. is Professor of Management at the University of Rhode Island. She has recently served as Chair of the Gender and Diversity in Organizations Division of the Academy of Management. Her research has focused on issues in Human Resources with publications in *Academy of Management Review*, *Journal of Applied Psychology*, and *Human Relations*. More recently her research and teaching interests focus on the experiential components of the classroom. Email: ecooper@uri.edu

Elizabeth A. McCrea, Ph.D., is an Instructor at the Pennsylvania State University Great Valley Graduate School of Professional Studies. She received her Ph.D. degree in Organization Management from Rutgers University in October 2004. Dr. McCrea is a Certified New Product Development Professional, an accreditation of the Product Development Management Association. Her research interests involve corporate entrepreneurship, product development, business strategy, and experiential learning. Her professional background includes operations and finance positions at Nabisco, Inc. Email: eam16@psu.edu

Kristin Backhaus, Ph.D., is an Assistant Professor of Management at the State University of New York at New Paltz. She teaches courses in human resources and organization theory. Her research interests include employee recruitment and selection, employer branding, and learning styles. Prior to her work as a professor, Dr. Backhaus worked in the human resources field. She currently serves on the Board of Governors of the Eastern Academy of Management. Email: backhauk@newpaltz.edu