

# The Effects of Scenario Planning on Perceptions of Emotional Intelligence

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## Abstract

This article reports the results of an exploratory research study with four organizations that participated in scenario planning. The primary research focus was to determine whether participation in scenario planning affects perceptions of individual emotional intelligence. Results show a statistically and practically significant effect, though several limitations are identified that mandate a conservative interpretation of study findings.

## Keywords

scenario planning, emotional intelligence, intervention research, quantitative scenario research, quasi-experiment

The scholarly literature related to scenario planning has grown in recent years with several articles intended to rigorously assess its various benefits (Meissner and Wulf 2013). These studies have focused on specific outcome variables such as decision making (Cairns and Wright 2018; Chermack and Nimon 2008; Goodwin and Wright 2001; Montibeller et al. 2006), mental models (Salas et al. 1999), managing uncertainty (Chang et al. 2007; Song and Chen, 2018; Wright and Goodwin, 2009), and learning culture (Mason 2003), among others. The research-based evidence to support scenario planning is growing yet lacks a robust scientific basis on which to make generalizable claims (Amer et al. 2013; Varum and Melo 2010). As a recent analysis has shown, the majority of scenario planning scholarship remains in the theoretical/conceptual domain, though some scholars are focusing attention on increased empirical research in efforts to establish a robust scientific basis for scenario planning (Chermack 2018).

## Problem Statement and Purpose of the Article

While additional empirical study of scenario planning is generally needed, inquiry can be directed from a variety of perspectives and starting points, including practice, existing research, or theorizing. Given that a significant body of empirical research from which to build on is in the emergent stage (Landy 2005; Meissner and Wulf 2013), theoretical arguments and expert practitioner experiences form the most common foundation for situating scenario planning research studies and growing the discipline. As a separate area of study, emotional intelligence has a deeper body of

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empirical research from which to draw (Harms and Credé 2010). Yet there are few established mechanisms for intervening, creating, and building emotional intelligence.

Emotional intelligence is based on the idea that there can be multiple forms of intelligence (Brackett and Mayer 2003). This foundational principle supports the notion that working in dynamic environments, with other people—and particularly in areas of uncertainty and ambiguity—requires social abilities beyond individual intellectual aptitude (Brackett and Mayer 2003; Mayer et al. 2004). While there is evidence of the ability for individuals to grow and develop their emotional intelligence (Cherniss and Goleman 2001), the mechanism for how this form of intelligence can be developed remains elusive. Because emotional intelligence skills require the ability to assert opinions, think into the future, listen to others, balance thinking with intuition, and deal with adversity (Goleman et al. 2013), there is a degree of face validity with a potential connection to scenario planning (Ducatel et al. 2001). In other words, there is a logical argument that the process of participating in scenario planning may provide an opportunity for participants to develop the same skill sets that are described as the core elements of emotional intelligence (Goleman et al. 2013).

The problem, therefore, is,

*Given a strong logical basis that scenario planning may affect participant emotional intelligence, there is no existing empirical study of a connection between the two phenomena.*

The purpose of this article is to empirically assess participant self-perceptions of emotional intelligence and how those perceptions may change as a result of participating in scenario planning. Aligned with this purpose, the intended contributions of this research study are to add to the existing data-driven research on scenario planning outcomes with specific attention to the potential link between scenario planning and emotional intelligence.

## Research Questions

The primary research questions that framed this study were as follows:

**Research Question 1:** Does scenario planning increase participant perceptions of emotional intelligence?

**Research Question 2:** Can scenario planning potentially be a tool for building emotional intelligence?

## Theoretical Framework

The following sections describe the foundations of both emotional intelligence and scenario planning followed by an integration of the two phenomena, which constitutes the theoretical framework for the study.

### Emotional Intelligence

Emotional intelligence refers to the set of abilities or perceptions an individual possesses to deal with and process emotions (Andrei et al. 2016; Zeidner et al. 2012). The term was first used in research in the early 1990s when authors Mayer and Salovey challenged the existing psychological paradigm that held emotional and logical thought could not coexist (Dhani and Sharma, 2016; Mayer et al. 1990; Salovey and Mayer 1989-1990). As a competing paradigm, the authors hypothesized that emotional thought was not in opposition to logical thought but instead a “contributor to logical thought and to intelligence in general” (Mayer et al. 1990, p. 772). The authors called this contribution emotional intelligence (EI) (Mayer et al. 1990; Salovey and Mayer 1989-1990). As a follow-up to their original work, authors Mayer, Salovey and Caruso (2004) further clarified emotional intelligence to be the cognitive abilities in the areas of managing emotions, understanding emotions, facilitating through use of emotions, and perceiving emotions. Moreover, the authors posited that the heightened ability to manage, understand, facilitate the use of, and perceive emotions proactively and reflectively promotes “emotional and intellectual growth” (Mayer and Salovey 1997, p. 5; Mayer, Caruso and Salovey 2004).

Emotional intelligence gained significant acknowledgment when Goleman wrote *Emotional Intelligence* in 1995. Goleman

introduced emotional intelligence outside of military industries, and into the everyday cultural lives of organizations, and defined emotional intelligence as a person's capacity to recognize their feelings along with others, and for controlling our emotions within ourselves, and our relationships. The work brought attention to the potential effectiveness of an emotionally intelligent leader, and the associated leadership traits in an organization. Emotional intelligence was set in five components that Goleman introduced, which are *Self-Awareness, Self-Regulation, Internal Motivation, Empathy, and Social Skills* (Goleman 1998). Goleman laid a strong foundation for emotional intelligence to be introduced to the general public that looked at the relationship between what made an effective leader, and the benefits it brought into an organization. Goleman (1998) further suggested that the emotional competence of an individual could be a main contributor to their professional and personal life.

According to Vanzant (2007), there are three overarching types of intelligence: (1) linguistic intelligence, (2) interpersonal intelligence, and (3) intrapersonal intelligence. Linguistic intelligence involves the mastery of lexicon, which considers the language and communication style of an individual. Interpersonal intelligence involves the ability to be able to understand the needs of others, and having empathy toward others. Examples of professionals who carry high levels of interpersonal intelligence are social workers, religious leaders, teachers, doctors, or police officers. Finally, intrapersonal intelligence involves attention to emotions within a personal work and life context. Individuals with high intrapersonal intelligence are thought to have self-awareness of their emotions and are the capacity to understand how their emotions might affect others around them (Vanzant 2007).

*Definitions of emotional intelligence.* People often express emotions based on how they perceive an event, or a person, and the ways in which they define their emotions and the responses that will follow (Salovey 2007). Emotional intelligence can be viewed as a framework for bringing insight and interest to

the mental capacity of how one will act within an organization when given power and responsibilities (Salovey 2007). Researchers have found that moods and emotions are important factors in how leaders manage their people, and make decisions that will affect their organizations (George 2000). Research findings have also suggested that the higher level of emotional intelligence one develops, the healthier relationships they will have with their peers and associates (Salovey 2007). Having a high level of emotional intelligence does not mean a person will automatically acquire these skills; instead, it means that the person has a high potential for learning about their competencies (Goleman 1999).

Caruso et al. (2001) defined emotional intelligence as a conceptual response to a situation that involves physiological, experimental, and cognitive aspects, among many other factors. Caruso et al. (2001) suggested that emotional intelligence occurs and is mitigated in the setting of relationships among individuals. Regardless of what relationships an individual may be involved in, the felt indicators are emotions (Caruso et al. 2001). Such indicators were the primary reasons behind the excitement around emotional intelligence, as it had the potential ability to affect job performance in the workplace (Petrides 2013).

*Emotional-intelligence-based approaches.* Emotional intelligence can be interpreted in multiple ways, and authors report varying findings based on the methods of measurement that have been applied (Mikolajczak et al. 2007; Petrides 2013). The two core concepts that are used to measure emotional intelligence are ability and trait based, which are situated on the ideas that cognitive abilities are not the foundation of successful adaptation, and that emotional capabilities or dispositions need to be considered (Mikolajczak et al. 2007)

The Emotional Intelligence Trait Model established criteria to understand self-perceptions people have of themselves, and these criteria are measured by self-reporting (Petrides 2013). Self-reporting can be done through one-on-one interviews or surveys. Individuals who have high trait models perceive themselves as

having the will to adapt to their new environments and conditions, capable of effectively communicating their feelings, successful, and competent, and they view all hardships as opportunities and are optimistic (Petrides 2013).

The Emotional Intelligence Ability Model connects emotion-related cognitive abilities, which are measured with maximum performance tests (Petrides 2013). The ability trait model also considers emotional intelligence as a reliable form of intelligence measured through performance tests. Participants who have characteristics of ability emotional intelligence (AEI) are generally thought to be capable of perceiving their emotions and the effects they may have in their interactions with others (Petrides 2013).

*AEI and trait emotional intelligence (TEI).* Emotional and intellectual growth manifests itself in one's ability to (1) appraise and express emotions in the self and others, (2) regulate emotion in the self and others, and (3) use emotions in adaptive ways (Salovey and Mayer 1989–1990). The latter includes the ability to display flexible planning, creative thinking, mood-redirection, and motivating emotions (Salovey and Mayer 1989–1990). All three abilities described earlier fall under the higher level emotional intelligence categories of AEI and TEI (Andrei et al. 2016; Zeidner et al. 2012). AEI refers to the cognitive process of emotional reasoning, while TEI refers to the self-reflection, self-perception, and awareness of one's emotional capabilities and constraints (Andrei et al. 2016; Mayer et al. 2008; Petrides et al. 2007).

*Emotional intelligence and leadership.* For decades, researchers have been attempting to define and operationalize their perspectives on emotional intelligence (Batool 2013; George 2000; Odumeru and Ogbonna 2013). In addition, researchers have attempted to determine whether emotional intelligence can be developed or is simply inherited (George 2000). They ask questions, such as, “How do leaders get associates to follow their beliefs?” “How do they react to complex situations in the workplace?” “How is

change influenced in the workplace?” (George 2000).

Batool (2013) suggested that there are two types of leaders who can generally be found in the workplace. These are transformational and transactional leaders. Transformational leaders are able to motivate and inspire their colleagues for the best interest of the organization and consider the feelings of others before their own (Batool 2013). Transformational leaders pay attention to the concern of their associates while at all times keeping the goals of the organization a primary goal, increase morale within their team, are labeled as role models within their organization and by their associates, and understand the strengths not only of others but also of themselves (Odumeru and Ogbonna 2013).

A transactional leader focuses on the performance of their team and bases rewards and disciplines on outcomes (Batool 2013). This type of leader focuses on the role of supervising, assuming that tasks are completed in a timely manner, are not as open to change, and are usually more effective in emergency situations and results-driven organizations (Odumeru and Ogbonna 2013).

*Emotional intelligence and human services.* Among human services professionals, leaders are often influenced with situations that are out of their control such as federal and local budgets, national consensus, policy mandates, and unstable environmental factors that include their clientele (Vanzant 2007). Human services is a service-oriented industry that tries to provide economic increases within low socioeconomic communities, and find employment for individuals who are in need of income, food, housing, and everyday life skills (Vanzant 2007). Researchers have conducted studies that attempt to highlight the relationship between the tenure of an employee, and productivity, based on their relationship with their immediate supervisors (Cherniss 2001). The strategic management styles that a leader brings into the organization have been shown to have an effect on the quality of services that are delivered, along with the relationships individuals build with their clientele (Vanzant 2007). In addition,

the human service sector not only requires a leader who is emotionally coherent, but it also requires its workers who deliver these services to be supported and empowered by the leadership team. Leaders can be effective by developing the ability to sense how their employees feel about their jobs, and by intervening when those employees begin to feel discouraged or dissatisfied (Cherniss and Goleman 2001).

*Emotional intelligence and employee engagement.* For a company to withstand competition, they must develop talented people who are engaged with the organization and motivated to take action to meet the goals set by leaders (AlMazrouei et al. 2015). Employees possessing high levels of emotional intelligence are more likely to have a higher level of job satisfaction, which in turn has an impact on morale and job satisfaction (Brunetto et al. 2012). Employee engagement not only focuses on making sure employees meet the goals of the organization, but it relates to organizational outcomes such as retention, productivity, customer loyalty, safety revenue growth, and consumer satisfaction (AlMazrouei et al. 2015). Engaged employees with high levels of emotional intelligence are also more likely to understand the personalities and emotions of coworkers and find ways to optimize working relationships (AlMazrouei et al. 2015).

*Measuring emotional intelligence.* Along with the construct of emotional intelligence, instruments intended to measure it also began emerging in the early 1990s (Dhani and Sharma 2016). The Mayer-Salovey-Caruso Ability-Based Emotional Intelligence Model was the first model to be conceptualized and operationalized into an instrument to measure emotional intelligence (Mayer and Salovey 1997). Carmeli (2003) made an early attempt to assess the relationship between emotional intelligence and one's behavioral attitudes, behaviors, and outcomes. The study findings suggest a positive correlation between heightened levels of emotional intelligence and positive attitudes, behaviors, and outcomes (Carmeli 2003). However, limitations of the study include its potential lack of generalizability (Carmeli

2003). While attempts were made to collect data from a large number of organizational groups, the nature of the sampling measures and participant parameters are likely to have affected external validity (Carmeli 2003). The authors also conceded that the instrument used to measure emotional intelligence, while having some evidence of score reliability and validity, was not vetted against other instruments used to measure emotional intelligence and was an initial attempt (Carmeli 2003).

### *Scenario Planning*

It is assumed that most readers have a degree of familiarity with the scenario planning literature, and thus, this section is kept brief and covers some historical highlights. It is not intended to be comprehensive or wide-ranging. Scenario planning has roots in military history dating back to the 1940s, when the term was used to describe possible outcomes and strategies associated with various aspects of military confrontations (DeWeerd 1967). The method gained prominence through promotion by Stanford Research Institute (SRI) member Herman Kahn (Derbyshire and Wright 2017; Varum and Melo 2010). Kahn applied the idea of thinking in multiple futures applied to thermo-nuclear war when he later left SRI to found the Hudson Institute (Kahn 1964). Kahn's ideas were adapted and modified for use in corporate strategy by Pierre Wack, Ted Newland, Henk Alkema, Michael Jefferson, and Napier Collyns, among others, at Royal Dutch/Shell in the 1960s and 1970s (Amer et al. 2013; Varum and Melo 2010). Shell's documented success with using scenarios to anticipate several oil shocks and competitor activities brought increased attention to the method (Wack, 1985a, 1985b, 1985c).

*The scenario process.* A specific process for conducting scenario planning was vague and undocumented until Ogilvy and Schwartz (2004) created a more stepwise approach to the development and facilitation of scenarios. The intent was to make scenarios more accessible to organizational leaders. Previously, Wack's (1985a, 1985b) approach was elusive and



relied heavily on the creativity of a rather intelligent group of individuals from wildly different backgrounds and experiences. The codification of scenario planning into more of a workshop format is clearly traced back to Ogilvy and Schwartz, who jointly (with Stewart Brand, Napier Collins, and Lawrence Wilkinson) founded a consulting company based on delivering scenario planning expertise to a wide range of U.S. and international corporations (Schwartz 1996). The name of their company was Global Business Network, or GBN. GBN lived a profitable life until the company was sold to the Monitor Group in 2000 and then to Deloitte in 2013, when the scenario practice was eventually closed down.

Of course, there were other schools of thought on scenarios and futures thinking as advocated by Godet (1987), Amara and Lipinski (1983), Ackoff (1970, 1978, 1981), and the Manoa School (Bengston et al. 2016; Dator 2009). Each “school” of scenario planning grew and developed in different ways. Some tended toward more of a modeling or predictive approach using early analytics to track trends and extrapolate them into the future (Amer et al. 2013). Other schools remained focused on the more intuitive, narrative, and participatory qualitative approach to developing scenarios with an ultimate aim of learning and deep thinking about the future rather than calling on computers to provide outputs (Huss and Honton, 1987).

*Scenario planning research.* Academic research on the effects and outcomes of scenario planning began in the late 1970s (Linneman and Klein, 1979, 1983; Phelps et al. 2001; Schoemaker 1995), but the majority of scenario planning scholarship remains theoretical/conceptual work (Chermack 2018). In some ways, research on scenario planning is a conundrum as the process of creating and presenting scenarios is highly constructivist in nature (Chermack and Van Der Merwe 2003). In this way, scenario planning can be viewed as an intervention similar to leadership programs, counseling, or various psychology interventions. These interventions can be designed and deployed in different ways, potentially

borrowing from the same themes. Yet these interventions are commonly studied quantitatively with pretest-posttest designs. Likewise, the scenario planning process does not preclude the use of quantitative approaches to understanding and documenting its outcomes. Scenario planning research has been slow to establish a strong empirical basis, with much of the scholarship focused on case examples and descriptions of potential ways for improving the process.

### *Scenario Planning Schools and Techniques*

While there is an assumption that most readers are familiar with the scenario literature, it is important to recognize that more than twenty different scenario methods have been documented and analyzed. Bradfield et al. (2005) composed typology of the principal scenario techniques (reprinted in Amer et al. 2013), which provides unfamiliar readers with a sense of just how varied the techniques can be. The debate continues as to whether there should be a conventional approach to scenarios, yet it is unlikely there will be such an agreement (see Table 1).

To be clear, the approach used in this applied study was generally from the “intuitive logics” school of scenario planning and is described with considerable detail in the “Methods” section.

### *Connecting Emotional Intelligence and Scenario Planning*

Scenario planning is an approach to strategic thinking that involves social communication and diverse thinking skills to address issues in uncertain environments and put plans into action (Peterson et al. 2003). Leaders of scenario work must be able to bring individuals with different perspectives together to work on a project, or future projects, and they must be able to have a perspective that gives credence to a variety of ideas (Cox 2011). Scenario planning is a process that helps leaders improve their decision-making skills by envisioning a background of possible future outcomes, and

**Table 1.** Comparison of the Principal Scenario Development Techniques (from Bradfield et al. 2005) and reprinted in Amer et al. (2013).

Scenario characteristics	Intuitive logics methodology	La prospective methodology	Probabilistic modified trends (PMT) methodology
Purpose of the scenario work:	Multiple, from a once-off activity making sense of situations and developing strategy, to an ongoing activity associated with anticipation and adaptive organizational learning.	Usually a once-off activity associated with developing more effective policy and strategic decisions and tactical plans of action.	A once-off activity to enhance extrapolative prediction and policy evaluation.
Scenario perspective:	Descriptive or normative.	Usually descriptive, can be normative.	Descriptive.
Scope of the scenario exercise:	Can be either broad or narrow scope ranging from global, regional, country, industry to an issue-specific focus.	Generally a narrow scope but examination of a broad range of factors within the scope.	Narrow scope focused on the probability and impact of specific events on historic trends.
Scenario horizon year:	Varies: 3–20 years.	Varies: 3–20 years	Varies: 3–20 years.
Methodological orientation:	Process orientation—inductive or deductive, essentially subjective and qualitative in approach relying on disciplined intuition	Outcome orientation directed and objective, quantitative and analytical approaches (with some subjectivity) relying on complex computer-based analysis and mathematical modeling.	Outcome orientation-directed and objective, quantitative and analytical approaches (with some subjectivity) using computer-based extrapolative forecasting and simulation models
Nature of scenario team participants:	Internal—scenarios developed by a facilitator from within the organization.	Combination of some key individuals from within the organization led by an expert external consultant.	External—scenario exercise undertaken by expert external consultants.
Role of external Experts:	Experienced scenario practitioner to design and facilitate the process; periodic use of remarkable people as catalysts of new ideas.	Dominant-expert-led process using an array of proprietary tools to undertake comprehensive analysis and expert judgments to determine scenario probabilities.	Dominant expert-led process using proprietary tools and expert judgments to identify high-impact unprecedented future events and their probability of occurrence.
Tools commonly used:	Generic—brainstorming, STEEP analysis, clustering, matrices, system dynamics, and stake-holder analysis	Proprietary—structural (Micmac) and actor (Mactor) analysis, morphological analysis, Delphi, SMIC Prob-Expert, Multipol, and Multicriteria evaluation.	Proprietary Trends Impact and Cross Impact Analysis, Monte Carlo simulations.

(continued)

**Table I.** (continued)

Scenario characteristics	Intuitive logics methodology	La prospective methodology	Probabilistic modified trends (PMT) methodology
Scenario starting point:	A particular management decision, issue, or area of general concern.	A specific phenomenon of concern.	Decisions/issues for which detailed and reliable time series data
Identifying key driving forces:	Intuition—brainstorming techniques, analysis of STEEP factors, research, and discussion with remarkable people	Interviews with actors involved in the phenomenon being studied and comprehensive structural analysis using sophisticated computer tools.	Fitting curves to historical time series data to identify trends and use of expert judgment to create database of potential high impact unprecedented future events.
Establishing the scenario set:	Defining the scenario logics as organizing themes or principles (often in the form of matrices).	Matrices of sets of probable assumptions based on key variables for the future.	Monte Carlo simulations to create an envelope of uncertainty around base forecasts of key indicators.
Scenario exercise output:	Qualitative—set of equally plausible scenarios in discursive narrative form supported by graphics, some limited quantification. Implications, strategic options and early warning signals increasingly a part of scenario output	Quantitative and qualitative—multiple scenarios of alternative futures supported by comprehensive analysis incorporating possible actions and their consequences.	Quantitative—baseline case plus upper and lower quartiles of adjusted time series forecasts, may be embellished by short storylines.
Probabilities attached to scenarios:	No, all scenarios must be equally probable	Yes, probability of the evolution of variables under assumption sets of actors' behavior.	Yes, conditional probability of occurrence of unprecedented and disruptive future events.
Number of scenarios generated:	Generally 2 to 4.	Multiple.	Usually 3 to 6 dependent on the number of simulations.
Scenario evaluation criteria:	Coherence, comprehensiveness, internal consistency, novelty underpinned by rigorous structural analysis and logics. All scenarios equally plausible.	Coherence, comprehensiveness, internal consistency—underpinned by rigorous structural and mathematical analysis; plausible and verifiable in retrospect.	Plausible and verifiable in retrospect.



helps them understand how their organizations can and may operate over time (Mietzner and Reger 2005). Collaboration and planning for future possibilities involves social interaction, where an individual or a group of people can change the dynamics of a group, which will have an influence of the performance outcomes for the organization (Cox 2011; Eder 2009).

One of the greatest values of scenario planning is taking complicated issues and connecting them in an understanding that is articulated and visible for others to see (Mietzner and Reger 2005). Researchers have found that failed scenario planning projects are often due to frozen mental models that do not allow for participants to comprehend what their organization may be facing (Wright et al. 2008). Scenario planning has also been used as a mechanism tool for community building with parties that may be at conflict with one another and dialogue for both parties to come into reconciliation with one another (Chermack 2011). This in addition creates images of how change may evolve among opposing members, and in return creates contexts for planning, organizing, and increasing motivation for new development and ideas comprehensively (Mietzner and Reger 2005).

For scenario planning to be effective, participants must be able to have difficult conversations, agree to disagree with one another respectfully, and recognize that a main goal is to gain a new understanding of complex systems (Maani and Cavana 2007). These activities theoretically and logically draw from the same bases as emotional intelligence. In other words, given this theoretical framework and literature review, it seems that individuals with high levels of emotional intelligence are more likely to engage in scenario work effectively.

### Summary

It seems clear there is a degree of overlap among the constructs, ideas, skills, and conceptual development of emotional intelligence and scenario planning. As has been described here, the logical connection between the two

phenomena provide a basis on which to situate the study.

### Hypotheses

Given the problem, established theoretical framework and supporting literature review, we hypothesize that scenario planning will significantly and practically increase participant self-perceptions of emotional intelligence. Accordingly, the null hypothesis is that there will be no statistically or practically significant mean difference between pre- and posttest emotional intelligence scores. These hypotheses are provided symbolically as follows:

$$H_0: \mu D = 0$$

$$H_1: \mu D \geq 0$$

### Research Method

The following sections present the research design, sample, data collection procedures, details about the instrument used to assess perceptions of emotional intelligence, and a description of the scenario planning intervention.

### Research Design

The research design was a single subject experimental design (Byiers et al. 2012). This was a pretest-posttest design without a control group, sometimes referred to as a quasi-experimental design. However, for clarity, the term *single subject experimental design* is used, to be most accurate. Single subject experimental designs are important for initial research projects that do not yet warrant the significant time and financial resources for more rigorous approaches.

Because the link between scenario planning and emotional intelligence has not been empirically made, and related existing scholarship rests on theoretical and conceptual arguments, the design was appropriate for the exploratory nature of the study, and represents an attempt to apply a degree of scientific rigor to scenario planning research and determine whether more complex designs should be conducted.

## Power Analysis

G\*Power was used to calculate power and sample size requirements (Cohen 1992; Faul et al. 2007). The analysis showed that forty-five matched pairs (pretest to posttest) were required to achieve a power of .88, an alpha of .05, and an effect size  $f = .25$ .

## Sample

Sampling in this study was entirely by convenience. Several local organization leaders were approached (after IRB approval to conduct the study) with an opportunity to participate in scenario planning in exchange for research data. After meetings with organizational leaders from a variety of local organizations in which the general project structure, time commitments, and terms of agreement were discussed, four organizational leaders elected to participate in the study and the project as a potential strategic benefit to their organization.

Once organizational agreements were in place, participant teams were selected. Within the four organizations, researchers were able to enroll forty-two participants that completed both the pretest and posttests. This sample missed the required forty-five participants by three. Because of the relative robustness of intended analysis (*t*-tests), there was little concern related to sample size issues (Faul et al. 2009), but it is recognized as a study limitation. Table 2 provides the number of research participants by organization. While there were more participants in each organization than reported in Table 2, only those who attended all workshops, and completed both pre- and posttests were included.

## Data Collection

Pretest data were collected at the start of the first scenario planning workshops for the four research groups. Posttest data were collected at the end of the final scenario planning workshop (approximately four months later). Data were collected by paper survey, including

**Table 2.** Number of Participants by Organization.

Organization	Number of participants
1	8
2	12
3	8
4	14
Total	42

consent forms and disclosure related to IRB procedures.

Participants were asked to identify a code number or name (phone extension, nickname, or other) and write their selected code on their paper survey. Researchers made a list of codes and provided the list at the time of the posttest in the case that any participant was not able to recall their code. Researchers were able to match data from pretests with posttests for forty-two participants. Pre- and posttest data were collected from forty-two participants in four organizations and input into SPSS for analysis.

## Instrument

The instrument used to measure perceptions of emotional intelligence was the Trait Emotional Intelligence Questionnaire, or TEIQue–Short Form (TEQue-SF; Cooper and Petrides 2010), initially developed in 2004. The TEQue-SF consists of thirty-three items intended to measure a single construct—TEI. The TEIQue has a relatively robust track record of use, though as Thompson (2003) reminds, “an instrument is never reliable or valid. Reliability and validity are properties of each data set, not of an instrument in general” (p. 101). The TEIQue has been differentiated from other EI measurement instruments for having “. . . a strong theoretical and psychometric basis” (Andrei et al. 2016, p. 262; Conte 2005; Matthews et al. 2002). Similarly, the TEIQue-SF has also been examined for robustness of its psychometric properties through the use of item response theory (Cooper and Petrides 2010). Moreover, global trait EI scores obtained through the TEIQue-SF have been compared with those gathered using the longer TEIQue (Petrides

et al. 2010). At the global level, the two forms yield almost exactly the same estimates of TEI (Petrides et al. 2010). Note that the TEIQue-SF is freely available to researchers (though permission to use it is required) and thus is not included as an appendix to this article.

### *Description of the Scenario Planning Intervention*

To reiterate, the scenario planning approach was from the “intuitive logics” school as discussed earlier. The scenario planning method was a hybrid of deductive and inductive approaches (Walsh 2005). Four separate scenario projects were facilitated in the four organizations recruited for the research project. Participants were selected by their organizational leaders because they had unique positions in their organizations to offer valuable perspectives on the strategic issue identified by each set of project stakeholders.

*Scenario planning interviews.* Once the scenario projects were approved and logistics were handled, approximately six participants were interviewed in each organization using the well-known “Seven Questions” (as cited in Chermack 2017, p. 96). These interviews allowed the scenario team to more deeply understand the strategic issue, the varying initial views of participants, and the context. Once the interviews were complete and analyzed, workshops were scheduled. At the start of the first workshops, pretest data using the TEIQue were collected. The workshops proceeded with the common intuitive logics approach developed by Ogilvy and Schwartz (2004); that is, brainstorming on a key strategic issue with sticky notes, consolidation of duplicates, ranking by impact, ranking by uncertainty, and constructing a 2X2 matrix using various combinations of the items in the high impact/high uncertainty category). It should also be noted that this approach has been augmented by many others (MacKay and Stoyanova 2017). The workshop was framed as a group interview by the scenario team, and the information observed and gathered was used

as a basis for further research into the various uncertainties in the business environments.

*Scenario development.* At this point, the approach flexed to a more inductive approach as promoted and described by Wack (as cited in Chermack 2017). The scenario team (without the workshop participants) worked to “breathe in” and analyze the information collected from the workshops and the research gathered from a variety of alternative sources (including various online sources, other scholarly publications, news media, expert opinions, and editorials) by meeting separately, with specific intent to develop the detailed scenario stories. Issues were further debated, and team members challenged each other to develop compelling, plausible storylines for each scenario. Several scenario team meetings over the course of four weeks resulted in written scenarios for each organization.

*Scenario drafting and feedback.* Once initial drafts of the scenarios were completed, they were fed back to small subgroups in each organization. Participants were asked to rate each scenario on its level of (1) plausibility, (2) challenge, and (3) relevance to the focus of the scenario project (this was not part of the research project; rather, the intent was to tailor the scenarios to achieve a subjective balance among the three criteria). The scenarios were mildly edited with careful attention to toning down scenarios that were perceived to be too implausible, too challenging, and less relevant. The goal was to ensure, to the degree possible, that the scenarios were plausible in the sense that they were realistic; challenging in the sense that they stretched the thinking of the participants, and relevant to the extent that they focused on the strategic issue at hand. It should be noted that there is no existing convention on how to judge the utility, accuracy, or fruitfulness of any scenarios. Once the scenarios were edited based on participant feedback, they were refined and adjusted with further research related to the relevant trends for each organization.

**Table 3.** Participant Demographic Data.

Demographic variables	Participant Group	
	<i>n</i>	%
Age of the organization		
0–5	7	16.66
6–10	13	30.95
11–15	8	19.06
16–20	14	33.33
21+	0	0
Total number of employees		
Less than 100	8	19.06
101–500	10	23.80
501–1,000	7	16.66
1001–10,000	17	40.48
10,001 +	0	0
Tenure in the organization		
0–2	4	9.52
3–5	12	28.56
6–10	18	42.86
10+	8	19.06
Position level		
Line worker	13	30.94
Middle manager	21	50.00
Senior manager	8	19.06
Total	42	100.00

*Decision testing.* On the completion of the written scenarios, additional workshops were scheduled to test, or wind tunnel (van der Heijden 1996, 2011) decisions. In these decision testing workshops, participants were asked to rank strategic options in terms of their risk and benefit to the organization for each scenario. It was a subjective and repetitive process, and participant ranking data were gathered and plotted in several visual displays. This information was taken by the scenario teams and compiled in final scenario reports for each organization. A final meeting was scheduled with each set of organization stakeholders to present the findings and recommendations of the scenario work.

## Results

The following sections present the data handling, data analyses, assumptions related to the statistical tests, and finally, the primary results.

## Data Analysis

The primary data analysis strategy was a matched pairs *t*-test. Using the codes provided by participants to anonymously mark their surveys, researchers matched pre- and posttest data and entered it into SPSS for analysis. It is necessary to report several characteristics of the data set before presenting the *t*-test results.

### Participant Demographic Data

In terms of demographic data, researchers elected to focus on specific characteristics of the participants, including the age of the organization, the total number of employees, tenure in the organization, and position level. Researchers did not ask about gender, race, or ethnicity information because these data were not primary drivers of the research question (see Table 3).

### Assumptions for Statistical Tests

The assumptions specific to a matched-pairs *t*-test are that (1) the data are continuous, (2) the data follow a normal distribution, and (3) the sample of pairs is a simple random sample from its population. Given the use of the TEIQue, the data are continuous. The descriptive statistics in the following establish that the data fit a normal distribution; however, researchers were not able to obtain a random sample, which is discussed in the “Limitations” section.

### Data Normality and Initial Analysis

Following Park (2015) and Lange and Ryan (1989), researchers examined Q-Q plots for both pre- and posttest data. No deviations from normality were observed that suggested the use of nonparametric statistics was necessary. In addition, skewness and kurtosis values were examined. Skewness values ranged from  $-0.95$  to  $2.4$ , and kurtosis values ranged from  $-0.98$  to  $3.4$ , all within acceptable ranges (Leech and Onwuegbuzie 2010).

**Table 4.** *t*-Test Results between TEIQue Pre- and Posttests.

	<i>M</i>	<i>SD</i>	<i>SE M</i>	95% confidence interval		<i>t</i>	<i>df</i>	<i>p</i>	<i>D</i>
				Lower	Upper				
El_pre–El_post	0.15	0.33	0.05	0.05	0.26	2.91	42.00	.01	0.51

### *Reliability of Scores in the Research Data Set*

Score reliability was calculated using Cronbach's Alpha. For the thirty-three items in the TEIQue (which comprise a single construct), pretest reliability was .87 and posttest reliability was .78, both above the accepted minimums (Nunnally 1978).

### *Validity of Scores in the Research Data Set*

Because of the relatively small sample size, examining score validity introduced some challenges. Researchers debated the use of an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA). Due to the nature and history of the TEIQue instrument, a CFA would have been the best approach to score validity assessment. However, CFA was judged an inappropriate analysis given the general expectation of having ten responses per item on the survey. In this case, with thirty-three items on the TEIQue and forty-two responses in total, the sample size did not justify a CFA.

While some authors indicate an *n* of 50 would be an absolute minimum for conducting an EFA others argue that EFA can yield useful "results for *n* well below 50, even in the presence of small distortions" (de Winter et al. 2009, p. 153). This provided a basis on which to justify an EFA analysis. Because the factor structure of the TEIQue is established, researchers selected an EFA with principal axis factoring, following the advice of Kline (2013). Principal axis factoring is generally used when there is an expected theoretical structure to the instrument and is a more conservative modeling approach (Kline 2013). Given the case of the short form TEIQue, in

which all thirty-three questions group to the same construct, and given the sample size, principal axis factoring was deemed the most appropriate approach to analyzing score validity (Kline 2013).

For the assessment, researchers examined the data in SPSS and forced the number of factors to one, driven by the theoretical structure of the instrument (Field 2009). The results showed that a one factor solution explained 34.42 percent of the response variance.

### *Summary*

The data examination reported earlier established that most assumptions were sufficiently met for *t*-test analysis. The exceptions are that random sampling was not achieved, and the sample size raises possible questions about score validity.

### *T-Test Results*

The paired samples *t*-test indicated that after participating in the scenario planning interventions, participants reported a statistically and practically significant change in their self-perceptions of emotional intelligence,  $t(42) = 2.91$ ,  $p < .01$ ;  $D = .51$ . The mean score increased from the pretest to the posttest, and the Cohen's *D* statistic indicates a medium effect size (Cohen 1969); however, effect size statistics are debatable and should be interpreted within the research context. In this case, there is no previous research examining the relationship between scenario planning and emotional intelligence. Thus, a conservative approach suggests a mild level of practical significance. The results are provided in Table 4, including a 95 percent confidence interval.



The analysis showed a statistically and practically significant result. In other words, the results show a positive change in how scenario planning participants perceived their emotional intelligence over the course of the scenario planning project. However, care must be exercised in interpreting these results. The results are not widely generalizable given the sampling procedures; at the same time, because the study involved four different organizations with entirely different contexts, the findings are more robust than a single case study.

## Limitations

While the research study resulted in a statistically and practically significant effect of the scenario planning intervention, there are several limitations that must be considered. Each is described with attention to a conservative interpretation of the results.

### *Lack of a Control Group*

While the highest standard of experimental research uses treatment and control groups, researchers were not able to obtain a control group in this study. The use of a control group allows researchers to more clearly isolate the effects of the intervention. As described in the “Method” section, exploratory research often uses a single-subject experimental design (Byiers et al. 2012) to establish a potential relationship before investing the additional resources necessary to recruit and manage a control group. However, without a control group, it is impossible to indicate that a variety of other factors might account for the results.

The research team did initially plan and gain approval for gathering control group data from each of the four organizations; however, participation was not adequate to include it in the study.

### *Lack of Random Selection and Assignment*

Even without a control group, it is always an option to select participants randomly in any quasi-experimental study (Campbell and

Stanley 1963). In this study, that would have required randomly choosing members of each of the four organizations to participate in the scenario planning interventions. Because of the nature of scenario planning, and the importance of participants having knowledge pertinent to the strategic issue, it is generally not feasible to apply random selection or assignment when thinking about scenario planning interventions.

## Measurement Issues

Like scenario planning, emotional intelligence is an area of inquiry that lacks a deep base in empirical research, though it is further along. Emotional intelligence scholars do not agree on precisely what it is, the relevant component constructs, and how to measure them (Brackett et al. 2011). To be sure, emotional intelligence is a complex phenomenon, and assessing participant levels is likely much more nuanced than can be assessed with a thirty-three-item instrument. This fact lends further weight to the exploratory nature of the study and underscores the caution that must be used in interpreting the results. Yet the development of the TEIQue–short form has more than a ten-year history, and procedures have generally been rigorous, making it the most robust measurement instrument currently available.

## Recommendations and Conclusion

Outcomes of this research include several recommendations related to further theorizing, research, and, practice for scenarios planning. First, these initial results are promising. Scenario planning does seem to affect emotional intelligence, though the limitations of the study have been clearly identified. The results here warrant replication studies to understand broader generalizability and to determine whether similar results can be achieved with different samples. While replication studies are uncommon, it is appropriate and necessary when considering the complexities associated with business interventions such as scenario planning.



Additional useful theories may be generated to help expand understanding of how scenario planning affects EI. To be clear, this study captures data from two points in time on self-perception-based surveys. The study entirely misses qualitative data, which can be useful in generating new theories. For example, future studies would add a qualitative component to understand specifically how and when during the scenario process participants reflect on their emotional intelligence—was a particularly argumentative point in the process a catalyst for some, many, or most participants?

To overcome the self-perception data used in the study, a control group would also be useful in any replication of this research. Another alternative would include the use of participant peer ratings of others' emotional intelligence. While this would complicate the data structure and analysis, gaining participant perceptions of others' emotional intelligence would extend the study beyond self-perceptions and increase the rigor in terms of reducing measurement bias. Research participants do not commonly judge their performance to be poor, their teaching to be below standards, or in this case, their emotional intelligence to be lacking.

Furthermore, it would be useful to understand how EI may influence scenario planning outcomes. For example, might EI be a predictor of readiness to engage in scenario planning. For both research and practice, it would be interesting to explore how this relationship may work multidirectionally. Connected to this recommendation is also the potential use of longitudinal research methods. Multiple measures of emotional intelligence over a longer time period would help to mitigate the possibility that a variety of other factors (beyond the scenario planning intervention) may have influenced self-perceptions of emotional intelligence.

The field of leadership development also stands to benefit from additional inquiry into the relationship between scenario planning and EI. Because EI is a reliable predictor of strong interpersonal relationships and transformational leadership, developing EI among organization members promises to enhance team dynamics

and performance. If scenario planning is a reliable tool for strengthening EI, it stands to reason that increasing scenario planning activity will have a positive impact on organizational culture, employee engagement, and results. Future studies may shed light on these connections and possibilities.

The question still remains if scenario planning can be considered an intervention to help build emotional intelligence. One study is simply inadequate to make such a conclusion, and therefore, comparing scenario planning to other (or another) emotional intelligence intervention might be a promising line of inquiry for emotional intelligence scholars.

Finally, a key purpose of this study was to demonstrate a research design that can bring further rigor not only to scenario planning but also to futures studies processes in general. Studies that gather data during futures studies interventions and explore their connections to outcomes are needed. Moving beyond case studies and consulting reports of futures projects is essential to evolve a scientific basis for scenario planning and futures studies overall.

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**Josh Nathan** was a doctoral student in Organizational Learning, Performance and Change at Colorado State University. Sadly, he passed away in 2017, and we honor his contribution to this project.