

Convergent validity of two decision making style measures

Gentrit Berisha, Justina Shiroka Pula and Besnik Krasniqi

University of Prishtina "Hasan Prishtina", Prishtina, Kosovo

Decision making research has witnessed a growing number of studies on individual differences and decision making styles, yet the lack of comprehensive frameworks and widely accepted measures has hindered research for a long time. There is an ongoing debate on whether individuals' styles dynamically change across time and situations according to circumstances. Furthermore, it is an open question whether these styles are mutually exclusive. Decision style measures seek to determine one's dominant style as well as less used styles. To our knowledge this is the first study of the convergent validity of two widely used decision making style measures: The Decision Style Inventory (DSI) and the General Decision Making Style (GDMS). The direction and strength of correlation between directive, analytical, conceptual and behavioral styles as measured by DSI and rational, intuitive, dependent, avoidant and spontaneous styles as measured by GDMS have been tested. Results of the current study are compared with previous studies that have used one or both of the instruments. Correlations between styles are consistent with findings from other studies using one of the decision style measures, but the strength of correlations indicates that there is no convergent validity between DSI and GDMS.

Keywords: decision making style, Decision Style Inventory, General Decision Making Style, convergent validity

The aim of this study is to test whether two of the most used measures in the decision making style literature show concurrent validity. A growing body of literature uses either Decision Style Inventory (DSI) or the General Decision Making Style (GDMS) to measure decision making style. The foundation of all rigorous research designs is the use of measurement tools that are psychometrically sound (DeVon et al., 2007). Schwarzer and Schwarzer (1996) point out that the weakness of many measures lies in their unsatisfactory psychometric properties, unstable factor structures, and lack of cross-validation. The APA Committee on Psychological Tests (APA, 1953) divides validity studies into predictive validity, concurrent validity, content validity, and construct validity (also see Cronbach & Meehl, 1955). Bäckström and Holmes (2001) note that construct validity can partly be shown by demonstrating that an instrument correlates in a theoretically meaningful way with other validated instruments measuring either the same, related, or different constructs. Campbell and Fiske (1959) postulate that validation is typically convergent. They go on to demand that before testing relationships between constructs, researchers should test the

relationship between independent measures of the same construct. Campbell and Fiske (1959) propose employing different methods of data collection rather than using the same method to test for convergent validity. Bryman (1989) adds to this debate by stressing that the multiple-method convergent validation mostly encountered in organizational research consists of the simultaneous use of different self-administered questionnaire measures of the same underlying construct. Convergent validation can be assessed by correlating a measure of some construct with other measures of the same construct, under the assumption that the latter is valid itself (Bohrnstedt, 2010). Nunnally and Bernstein (1994) claim that validation is a never ending process. They suggest that most of psychological measures need to be constantly evaluated and re-evaluated to derive modifications or propose new approaches.

Dewberry, Juanchich, & Narendran (2013) claim that relationships between the various scales measuring decision making styles have been poorly understood. Leonard, Scholl, & Kowalski (1999) note that with the growing number of measures of cognitive style, personality type, decision making style, and learning style, it has become unclear whether researchers are measuring the same or different factors. They examined the relationship between four commonly used measures of cognitive style, Myers-Briggs Type Indicator (MBTI), the Group Embedded Figures Test, the Learning Styles Inventory, and the Decision Style Inventory, only to conclude that they are not strongly interrelated and appear to be measuring different aspects of information processing and decision making. Rowe and Boulgarides (1992) suggest that two decision making dimensions of Myers-Briggs are linked to each of the decision making styles as measured by Decision Style Inventory (DSI). This hypothesis was not supported by Leonard et al. (1999) who found that only one of the MBTI dimensions was linked to each of decision making styles. Spicer and Sadler-Smith (2005) have examined the psychometric properties of General Decision Making Style (GDMS) confirming the instruments' soundness as well as its validity, mainly by considering relationships with other instruments. Baval'ár and Orosová (2015) report that studies which have utilized GDMS mostly have reported the factor structure and inner consistency of the instrument, whereas concurrent and predictive validity studies have not been sufficiently studied. Apart from reporting on construct validity, content validity, face validity, several studies (Rowe & Mason, 1987; Mech, 1993; Martinson, 2001) report relationships between decision making style instruments as

Corresponding author: Gentrit Berisha, University of Prishtina "Hasan Prishtina", Agim Ramadani, nn, 10 000, Prishtina, Republic of Kosovo, e-mail: gentrit.berisha@uni-pr.edu

criteria for the instrument's soundness.

There have been several studies focusing on GDMS's relationships with Style of Learning and Thinking (SO-LAT; Gambetti, Fabbri, Bensi, & Tonetti, 2008), Zimbardo Time Perspective Inventory (ZTPI; Carelli, Wiberg, & Wiberg, 2011), Attitudes Toward Thinking and Learning Scale (ATTLS; Galotti et al., 2006), and DSI's relationships with MBTI (Rowe & Mason, 1987; Leonard, et al., 1999), and Administrative Styles Questionnaire (ASQ; Al-Omari, 2013). To our knowledge this is the first attempt to evaluate the relationship between Decision Style Inventory (Rowe & Mason, 1987) and General Decision Making Style (Scott & Bruce, 1995). This paper contributes to validations of GDMS and DSI by testing their convergent validity in a sample of business school students.

Decision making style

Decision style provides a means for understanding the way that the human mind operates in making decisions (Rowe & Davis, 1996). According to Nutt (1990) "style offers a way to understand why managers, faced with seemingly identical situations, use such different decision processes." Rowe and Mason, (1987) suggest the term *decision making style* to refer to the way a person uses information in decision formulation. Conceptualizing decision making styles with the dimensions of information gathering and processing is the starting point for multiple studies (McKenney & Keen, 1974; Robey & Taggart, 1981; Mitroff, 1983; Driver, 1983; Rowe & Mason, 1987; Kinicki & Williams, 2013). Over time several waves of research have been conducted concerning stylistic aspects of decision making, yet as Tatum, Eberlin, Kottraba, & Bradberry (2003) point out, there is no universally accepted classification of decision making styles. Leykin and DeRubeis (2010) emphasize that several questionnaires assessing decision styles have been developed, each of them containing a small set of decision styles. Many researchers more than one inventory or questionnaire to measure decision making styles (Kozhevnikov, 2007; Bruine de Bruin, Parker, & Fischhoff, 2007), but this is not practical due to considerable overlap in some subscales of these questionnaires (Leykin & DeRubeis, 2010).

Rowe and Mason (1987) hold that Kurt Lewin is the key contributor to managerial applications of decision styles. Lewin (1936) is perhaps the first to introduce the dynamic relationship between person and environment. He claims that the style of the person and the environment govern behavior and introduces the concept of life space to comprehend both. Lewin's notion of a life space added a dynamic dimension to the workings of an individual's mind (Rowe & Mason, 1987). Taggart, Robey, and Kroeck (1985) claim that in addition to effects of the elements of the situation (decision maker's task and environment), the decision maker's style may explain a substantial amount of variation in managerial decision making.

The decision making styles literature has yet to develop a comprehensive conceptual framework (Mohammed & Schwall, 2009; Hamilton, Shih, & Mohammed, 2016). Conceptions range from decision making styles being interchangeable with cognitive styles (Anderson, 2000) to being a subset of cognitive style (Kozhevnikov, 2007). Thunholm (2004) claims cognitive styles are a subset of decision making styles. There have been several attempts to establish comprehensive conceptual models of decision making styles (Dewberry et al., 2013; Leykin & DeRubeis, 2010; Appelt

et al., 2011) that have yet to be thoroughly encompassed by theory and research. Decision making styles are usually assessed by means of self-report instruments, with which respondents describe introspectively the way in which they perform certain tasks, check personal habits or preferences or endorse statements about what they think of themselves (Raffaldi, Iannello, Vittani, & Antonietti, 2012). Gati, Landman, Davidovitch, Asulin-Peretz, and Gadassi (2010) claim that there are over 160 instruments that aim to distinguish among the various ways people make decisions.

There is lack of consensus among researchers whether decision making styles are stable over time or if they are alterable easily and frequently. Whereas for Kahneman (2003) and Epstein (1994) decision making styles are not continuous traits but rather cognitive systems, for Scott and Bruce (1995) and Thunholm (2004) people have a dominant style that can change across situations based on individual characteristics. Baron (1985) confronts the traditional view that styles are stable dispositions by claiming that styles are situation specific. Furnham (2002) outlines this debate by stating that "despite some variability, individuals tend to exhibit consistent patterns of behavior across situation and over time. However they can choose to change those styles and learn other forms of behavior. It is relatively easy to develop another style." While many researchers (e.g., Penino, 2002; Gambetti et al., 2008) claim decision making styles differ by situation and as such are different from cognitive styles and psychological types that remain unchanged across situations, other researchers (e.g., Rowe & Boulgarides, 1983; Betsch & Iannello, 2010) refer to them as personality traits. Scott and Bruce (1995) posit that decision making style is not a personality trait, but a habit-based propensity to react in a certain way in a specific decision context. Driver, Brousseau, and Hunsaker (1990) propose a model of dynamic decision style. The rationale behind it is that most of people have more than one style, adopting styles to suit environmental and personal conditions. Streufert and Nogami (1989) speculate why some employees perform well even when transferred between jobs or tasks, whereas others (with the same level of intelligence, experience, and training) perform reasonably in one task environment but fail to perform well when transferred to a different environment. They suggest that a reason for these surprising differences in performances could be traced to the cognitive styles. Brousseau, Driver, Hourihan, & Larsson (2006) argue that decision style is influenced by circumstances. In order to respond to dynamic environment, managers need to have the ability to call on all styles (Brousseau et al., 2006). They conclude that in order for leaders to succeed, their behaviors and styles must evolve over the course of their careers. Decision making style determines how each individual responds to external world. Alignment of individual's style and environmental requirements is a key element in managerial effectiveness and executive success (Rowe & Mason, 1987).

Decision making style is a term used more often in the career development and occupational behavior literature than in the decision making literature (Scott & Bruce, 1995; Highhouse, Dalal, & Salas, 2013). According to Rowe and Boulgarides (1983) decision styles have had a wide application in many fields like training in decision making, person-job fit, personnel selection and development, career planning and education, and creativity development. Understanding decision style characteristics provides the base to improve communication, planning, goal setting, leadership style and team building (Driver et al. 1990). The

following section focuses on decision making style measures that are widely used in the literature.

Decision making style measures

Together with the MBTI, DSI and GDMS are the most utilized instruments in the decision making style literature. Whereas the MBTI is more of a personality indicator, DSI and GDMS (see Figure 1) are exclusive decision making style measures based on previous instruments, integrating earlier work on decision making styles (Scott & Bruce, 1995), encompassing their taxonomies (Galotti et al., 2006), or incorporating many of the attributes of other decision style models (Rowe & Boulgarides, 1983).

The Decision Style Inventory classifies people into four styles depending on their cognitive complexity and their value orientation. Rowe and Mason (1987) summarize the characteristics of the styles: the directive style has low tolerance for ambiguity and is oriented to task and technical concerns; the analytical style has a high tolerance for ambiguity and is oriented to people and social concerns; the conceptual style has a high tolerance for ambiguity and is oriented to people and social concerns; the behavioral style has a low tolerance for ambiguity and is oriented to people and social concerns. Rowe and Mason (1987) claim that the DSI has shown excellent face validity with well over 90 percent of the people who took the test agreeing with its findings. Test-retest reliability lies at .7, making it a recommendable psychometric instrument. Alongside the developers of the Decision Style Inventory who have reported on its psychometric properties (Boulgarides, 1984; Rowe & Mason, 1987; Rowe & Boulgarides, 1992; Boulgarides & Cohen, 2001), several authors (Shackleton, Pitt, & Marks, 1990; Connor & Becker, 2003; Fox & Wayne, 2005) conclude that the DSI is a valid instrument for measuring decision style.

Scott and Bruce (1995) have created GDMS as a response to “the lack of generally available, psychometrically sound instrument for measuring decision style.” Much of their conceptualization of decision style has been shaped by building on the work of Driver et al. (1990) in their flagship book *The Dynamic Decision Maker*. From prior theorizing and empirical research, they identified four decision making styles: rational, intuitive, dependent and avoidant. After administering the 37 item questionnaire with the first sample for evaluation, Scott and Bruce (1995) reduced it to 25 items and tested it in three subsequent samples. A fifth style, spontaneous, was identified from the first sample. Scott and Bruce (1995) have defined decision making styles in behavioral terms: the rational decision making style is characterized by a thorough search for information and logical evaluation of alternatives; the intuitive decision making style is characterized by a reliance on hunches and feelings; the dependent decision making style is characterized by a search for advice and direction from others; the avoidant decision making style is characterized by attempts to avoid decision making and spontaneous decision making style is characterized by a feeling of immediacy and a desire to come through the decision making process as quickly as possible. Apart from the authors, several researchers (Russ, McNeilly, & Comer, 1996; Sager & Gastil, 1999; Loo, 2000; Spicer & Sadler-Smith, 2005; Galotti et al., 2006; Sylvie & Huang, 2008; Allwood & Salo, 2012; Curşeu & Schruijer, 2012) have tested GDMS’s validity and endorse it as one of the most used and sound instrument in decision making literature.

DSI and GDMS differ significantly in method. Whereas DSI items are scenario-based and determine the relative propensity to make use of four decision making styles (Martinsons & Davison, 2007), GDMS consists of statements describing how individuals go about making important decisions (Thunholm, 2004). Testing for relationships between styles, Scott and Bruce (1995) assert that the pattern of correlations suggests conceptual independence among the five scales of the GDMS. Correlations among the subscales of the GDMS would imply that the decision making styles are not mutually exclusive, and that individuals do not rely on a single decision making style (Scott & Bruce, 1995). When taking the DSI, individuals are forced to rank four possible responses each representing a decision making style even when they may appear equally desirable or undesirable (Rowe & Mason, 1987).

These two instruments also differ in terminology, with none of the styles of one instrument having an analogue in the other (see Figure 1). The DSI furthermore combines styles into different patterns.

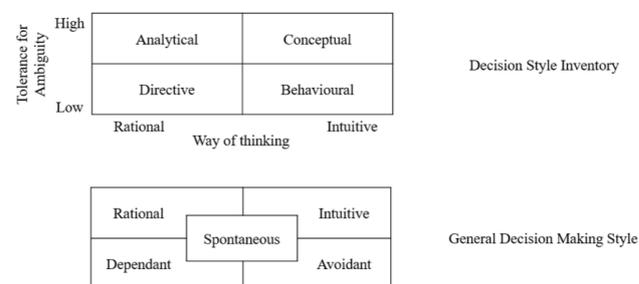


Figure 1. Decision Style Inventory and General Decision Making Style. Source: Rowe et al. (1984); Scott & Bruce (1995)

Rowe et al. (1984) indicate that directive and analytical styles create the rational style pattern (DSI_Rational), and behavioral and conceptual styles create the intuitive style pattern (DSI_Intuitive). Individuals with a rational style are logical, abstract and focused; individuals with an intuitive style are creative, relational and empathetic (Rowe & Boulgarides, 1983; Rowe & Mason, 1987). The rational and intuitive pattern of DSI fit with rational and intuitive decision making styles of GDMS.

Method

Participants

A sample of 152 management undergraduates, 88 female and 64 male, with an age range from 20 to 23, participated in the study. Students were in the phase of finalizing studies and choosing their future career paths. They participated in career decision making workshops as part of a course and the two instruments were part of a larger questionnaire. Although reliance on student participants in social studies has been criticized, Gordon, Slade, & Schmitt (1986) suggest that this practice is prudent when it comes to identifying causal relations among general behavioral constructs where social and cultural characteristics of the subjects do not influence the research.

Procedure

This research has been a part of a larger study conducted upon completion of a decision making course. Questionnaires were administered anonymously in classroom setting to ensure student's sense of engagement to the task. Afterwards students were accommodated in a large auditorium and debriefed about the self-report questionnaire. Since students were Albanian speakers, back translation was used to verify the translation of questionnaires (Brislin, 1970). Convergent validity was tested with standard tools using SPSS 23.

Instruments

Decision Style Inventory (Rowe & Mason, 1987) and General Decision Making Style (Scott & Bruce, 1995) are the decision making style instruments used in the study. The DSI consists of 20 items of four behavioral descriptions representing one of the four decision styles (Rowe & Mason, 1987). Respondents were asked to choose one of the mutually exclusive numbers (1 – least like me; 2 – slightly like me; 4 – moderately like me and 8 – most like me). Once all responses are ranked, the scores in each column are totaled. Each column represents one of the decision making styles. Authors have developed a style intensity assessment tool that represents style dominance. The intensity of each style is labeled as very dominant, dominant, back-up and least-preferred. Using a scoring system authors have developed, the intensity of each style is labeled as very dominant, dominant, back-up and least-preferred. The GDMS instrument consists of 25 items, scored on a five-point Likert-type scale, ranging from “strongly agree” to “strongly disagree” (Scott & Bruce, 1995). Each style is represented by 5 items, with a maximum score of 25 and a minimum score of 5.

Results and Discussion

The descriptive statistics and correlations for the scales used in the study are presented in Table 1. Cronbach alpha for GDMS scales are between .54 and .7, with only one style (dependent) having an acceptable internal reliability at .7, whereas rational, intuitive, avoidant and spontaneous styles scored .54, .67, .6, .68 respectively. When assessed together the scales give a score of .71 making it a reliable instrument. DSI was tested for face validity, with 93 percent of respondents agreeing with the style suggested by the instrument. This is in line with the levels reported by Rowe and Mason (1987). Cronbach alpha for DSI was not calculated due to the specific nature of the instrument.

Most of the respondents (67/152) had a behavioral style, directive style being the second most frequent (44/152), whereas conceptual (23/152) and analytical (18/152) styles were less frequent. Other studies (Mech, 1993; Jamian, Sidhu, & Aperapar, 2013) report behavioral style being the predominant style among different samples. In the Decision Style In-

ventory instrument each style is negatively correlated to other styles, which is consistent with instruments scoring system of mutual exclusivity. The strongest negative correlation exists between directive and conceptual styles (-.52) and between analytical and behavioral (-.49) which was expected since they are the extreme opposites in the dimensions of tolerance for ambiguity and value orientation. The low correlation values between decision making style as measured with DSI and gender and age support previous studies (Rowe & Boulgarides, 1983; Rowe & Mason, 1987; Mech, 1993) suggesting there is no significant correlation between these two individual differences and decision styles.

In the GDMS instrument only the rational and avoidant styles are negatively correlated which supports Scott and Bruce's (1995) finding with an undergraduate's sample. Moreover, the current study supports the most consistent correlation pattern, the positive correlation between intuitive and spontaneous styles (.41 in this study; between .32 and .53 in all four of Scott and Bruce's samples). All styles correlate negatively with age, yet insignificantly, with rational style having the highest negative correlation. Since the age variance of respondents is just four years (20–23), it prohibits drawing conclusions. Correlations of styles with gender are insignificantly low.

Pearson correlations between styles measured by DSI and GDMS were used to determine whether they have convergent validity. 13 of 20 correlations between styles are negative suggesting that when comparing DSI and GDMS there is no convergent validity. The strongest negative correlation (-.18) is evidenced between intuitive style and analytical style. This is consistent with what the styles stand for, as people with an analytical style use considerable information and are very careful in the examination of alternatives (Rowe & Boulgarides, 1983), whereas people with an intuitive style use hunches and feelings in decision making (Scott & Bruce, 1995). As for the positive correlations, the strongest (.28) is between dependent style and behavioral style. This is supported by their similar characteristics, given that dependent style people search for advice and guidance from others before making important decisions (Scott & Bruce, 1995) and behavioral style people focus on people in the decision making process (Leonard, Scholl, & Kowalski, 1999). Moderately low reliabilities and inability to determine reliability and validity with same tests due to difference in method, impede correction of correlations for attenuation.

Correlations between styles (below diagonal) suggest that there is no convergent validity between Decision Style Inventory and General Decision Making style. The Rational style pattern has a positive correlation with rational style and intuitive style pattern has a positive correlation with intuitive style. Their correlations with the opposite styles are negative at the same power. The DSI intuitive style pattern has a stronger correlation with dependent and avoidant styles than it does with intuitive style. These two

Table 1. Means, Standard Deviations and Correlations between GDMS and DSI and DSI style patterns

| | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|------------------------|--------|-------|------|--------|--------|--------|--------|--------|---------|------|-------|-------|-------|-------|----|
| 1. Gender | .42 | .50 | 1 | | | | | | | | | | | | |
| 2. Age | 20.92 | .95 | .21* | 1 | | | | | | | | | | | |
| 3. Directive (DSI) | 77.78 | 14.62 | -.02 | .16 | 1 | | | | | | | | | | |
| 4. Analytical (DSI) | 82.32 | 11.53 | -.04 | -.11 | -.17 | 1 | | | | | | | | | |
| 5. Conceptual (DSI) | 73.91 | 12.82 | .12 | -.14 | -.53** | -.21* | 1 | | | | | | | | |
| 6. Behavioral (DSI) | 65.99 | 14.49 | -.06 | .05 | -.44** | -.49** | -.19* | 1 | | | | | | | |
| 7. DSI_Rational | 160.10 | 17.44 | -.04 | .06 | .76** | .56** | -.58** | -.69** | 1 | | | | | | |
| 8. DSI_Intuitive | 139.90 | 17.44 | .04 | -.06 | -.76** | -.56** | .58** | .69** | -1.00** | 1 | | | | | |
| 9. Rational (GDMS) | 21.47 | 2.59 | -.07 | -.21** | -.03 | .14 | -.11 | .02 | .07 | -.07 | 1 | | | | |
| 10. Intuitive (GDMS) | 17.63 | 3.62 | .06 | -.10 | .09 | -.18* | -.07 | .11 | -.04 | .04 | -.02 | 1 | | | |
| 11. Dependent (GDMS) | 19.67 | 3.62 | -.07 | .01 | -.05 | -.11 | -.16* | .28** | -.11 | .11 | .22** | .09 | 1 | | |
| 12. Avoidant (GDMS) | 11.38 | 3.81 | .14 | .08 | -.01 | -.13 | -.07 | .18* | -.09 | .09 | -.12 | .15 | .27** | 1 | |
| 13. Spontaneous (GDMS) | 13.43 | 3.96 | .06 | -.03 | .22** | -.04 | -.14 | -.06 | .15 | -.15 | -.10 | .38** | -.01 | .38** | 1 |

Note: DSI_Rational is the pattern style determined when directive and analytical style scores are summed up; DSI_Intuitive is the pattern style determined when conceptual and behavioral style scores are summed up

Gender was coded as 0 (Female) and 1 (Male)

* $p < .05$

** $p < .01$

styles correlate positively with rational style in all of Scott and Bruce's (1995) samples, but this does not explain the low correlation between intuitive style and intuitive style pattern. The DSI rational style pattern has a stronger correlation with spontaneous style than with rational style. One possible explanation for this could be because rational style pattern contains scores from directive style and it is characterized with making fast decisions which complies with spontaneous style making "snap" and "spur of the moment" decisions (Scott & Bruce, 1995).

The rationale behind this lack of strength in correlation, albeit the right direction, may be found in differences in instrument's methods or what Bryman (1989) calls "common method variance." Scott and Bruce (1995) concluded that the decision making styles are independent but not mutually exclusive and that people seem to use a combination of decision making styles in making important decisions. The correlation analysis from the sample, the forced choice and mutual exclusive scoring of DSI instrument imply that this instrument determines style dominance, whereas GDMS styles are independent and a respondent can score mutually high or low in every style.

Conclusion

There is a growing interest in studying decision making style. Notwithstanding, the lack of a comprehensive framework and measures is perceived as the main reason why this field of study is not well established in decision making research. There is a quandary whether decision making style instruments measure the same construct. This research paper has shed light on the validity of two of the most used decision making

style measures by testing their convergent validity. Although the direction of correlations is consistent with prior research and theory, the lack of strength of correlations suggests that there is no convergent validity between DSI and GDMS. The scoring systems of these two instruments are different, but nevertheless this study shows that they do not measure the same constructs. The practical implication of this research is that the two decision making measures should be used with caution from both practitioners and researchers, in particular when comparing decision making style constructs with other constructs.

Limitations and further research

Self-report questionnaires like decision making style measures rely on respondents making accurate judgments about themselves and therefore have the potential for bias and unreliability. Future research on validity of these and other decision making style instruments should therefore employ different samples. Moreover, future research should have managers and other decision makers in an organizational setting as respondents of these questionnaires as their wording is not intended specifically for students. The study falls short of meeting Nunnally's (1978) rule of ten respondents per item. As size of sample could influence strength of correlations, future research on convergent or other construct validity should seek to increase sample size and test across instruments and different samples. The forced choice scoring system in the Decision Style Inventory produces a perfect negative correlation between style patterns.

The conceptualization of decision making styles has been influenced by the contributions of Driver et al.

(1990), who proposed a dynamic decision style model. Both dynamic decision making and decision making style consider the person-environment relationship. Decision making style measures have seen extensive application in the decision making literature and should also be integrated into dynamic decision making studies.

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