Chapter One

FourSight Overview & Rationale for Creation

Introduction

This chapter provides an overview of *FourSight: The Breakthrough Thinking Profile*. It describes the origins of the measure and why it was created. This information is valuable for both researchers and practitioners as it provides important background details. When using a measure in practice or research, one should have a sense for the measure's history. This context allows the user to apply and understand the measure more skillfully. Therefore, this chapter explores both the practical and theoretical underpinnings of FourSight.

FourSight: A Brief Overview

FourSight: The Breakthrough Thinking Profile is an assessment designed to help individuals and teams better understand how they approach solving problems through creative thinking.

FourSight helps individuals recognize their natural strengths when solving problems creatively. As people become more aware of their natural tendencies and strengths, they become more adept at employing them. The measure also indicates areas in the creative process that pose a challenge for the individual, thereby illuminating blind spots that may limit personal effectiveness. Once aware of such challenges, individuals can learn strategies to enhance their creative problem-solving skills.

FourSight is also extremely useful for teams. A profile of team members' scores may help individuals become more tolerant and appreciative of different styles of problem solving. This profile helps team members realize why they behave and interact the way they do when solving problems together. As a result this information improves communication and creates a better working atmosphere.

Formal development of FourSight began in 1994. Originally called the Buffalo Creative Process Inventory, or BCPI, eight different versions of the measure have been tested with more than 1,000 respondents. There is mounting research support that highlights both its theoretical soundness and usefulness.

Theortical Background

The four preferences of FourSight are based on the very powerful creative process model called "Creative Problem Solving." Creative Problem Solving (CPS) is a systematic process that helps individuals and teams analyze problems, generate and refine ideas, and implement action plans more effectively. Ultimately, the CPS process enables individuals and teams to unleash more of their creative potential.

The CPS model has a long, rich history. Originally conceived by Alex Osborn (1953), CPS has undergone nearly 50 years of development and research. When Alex Osborn, who is perhaps best known for the development of the creative-thinking tool "Brainstorming," retired from his executive position with one of the world's largest advertising firms, he set up his home in Buffalo. Upon his retirement, he began vigorously to pursue his dream of proving that creative thinking could be developed and taught. He accomplished this primarily through the development and testing of CPS. Today, CPS is one of the most widely used and best researched creative-thinking models in the world.*

The 6 Stages of CPS

Identify Goal, Wish or Challenge
Identifying a goal, wish or challenge that requires creative thinking

Gather Data
Gathering background information about the goal, wish or challenge

Clarify the Problem
Clarifying the problem by identifying the specific issues that need to be resolved

Generate Ideas
Using imaginative thinking to generate many varied and original ways of resolving the problem

Select & Strengthen Solutions
Selecting, evaluating, and refining promising ideas into workable solutions

Plan for Action
Developing a plan of action that builds on sources of assistance and overcomes potential sources of resistance

** If you wish to see the research that supports this claim see Torrance (1972), Torrance and Presbury (1984), and Parnes (1987).*

FourSight helps reveal how people interact with the CPS process. There are many useful resources regarding CPS. To learn more, see any of the following books: *Firestien (1996); Isaksen, Dorval and Treffinger (1994); Parnes (1997); VanGundy (1992); or Vehar, Miller, and Firestien (1999).*

Practical Experiences that Led to FourSight

As director of the International Center for Studies in Creativity at Buffalo State College, and as a creativity consultant, I have taught CPS to many groups. I have also observed many people who are learning to facilitate CPS with groups. These experiences led me to conclude that creative problem solving is not static, meaning it is not a cut-and-dry process that every individual moves through and uses in exactly the same way. The process is alive and will change based on the individual who is learning and using it.

On a number of occasions I have seen learners react quite differently to the same part of the CPS process. For example, I have seen some learners really take to and enjoy the phase of the process in which ideas are broken down and evaluated. Meanwhile, others in the very same group have reported frustration with this aspect of the process. They said it took a lot of energy for them to focus on evaluating ideas. In other cases I have seen course participants dive headlong into the idea generation phase of the process. They said thinking in a non-judgmental atmosphere and striving to produce many ideas felt really natural to them. Others, meanwhile, stand back and marvel at these individuals, saying, "I don't naturally think like this" or "I have a really hard time thinking out-of-the box."

I have also observed differences in how people facilitate the CPS process. Graduate students have reported to me that they avoid areas of the process that they personally find less comfortable. They seem to struggle with those areas of the process. It takes them more energy to master the CPS stages, phases, and tools that do not align with their natural preferences.

These experiences indicate to me that, like almost every thing we learn, people do not learn or apply CPS in the exact same way. Individuals demonstrate strengths, biases, and preferences for different aspects of the problem-solving process. These insights, borne out of practice, lead to the creation of FourSight.

Theoretical Principles that Guided the Development of FourSight

Psychological measures must be grounded in theoretical principles. Why is this so important? Because people tend to give credence to the results of psychological measures, whether they are valid or not. The field of creativity has many measures. In fact, Puccio and Murdock's (1999) survey of measures designed to assess creativity and constructs related to creativity, produced a list of more than 200 measures. Not all of these measures are of equal value. Some appear to be home-grown measures, based only on one person's conception of creativity. This approach creates serious doubt as to the validity of such measures. A sound theoretical foundation helps to ensure that the measure is actually assessing a meaningful psychological construct.

FourSight was based on a number of well-known theoretical principles in creativity and psychology.

The principles that serve as pillars to FourSight are:

1. The creative process is a natural process, i.e. all normally functioning people solve problems in creative ways in both their professional and personal lives.
2. The CPS model is a valid way of depicting the areas of operation within the creative process.
3. The creative process, specifically the CPS process, involves a series of mental operations.
4. People possess preferences for different mental operations, which psychologists call cognitive styles; and
5. Since the creative process is a cognitive process that people engage in naturally, people will possess different preferences for areas within the creative process.

Essentially FourSight is based on the belief that CPS is a reasonable reflection of the creative process and that people, through their cognitive styles, will express preferences for the various men-

tal activities involved in the creative process. It is expected, therefore, that people will, by nature, have a greater or lesser tendency to enjoy certain parts of the creative process and that these tendencies can be measured through a self-report inventory.

Summary

FourSight is based on the CPS process, perhaps the most widely used and well researched method for nurturing creative thinking. The purpose of FourSight is to help individuals understand how they naturally link with the CPS process.

Chapter Two

History & Development

Introduction

A good measure is not dreamt up overnight. It evolves over time and through hard work. The purpose of this chapter is to review how FourSight was created. It examines the efforts that have gone into the construction of the measure.

Creation of the Item Pool

Early exploration into preferences relative to CPS began in the early 1990s. Initial effort focused on the plausibility of individual differences as seen through the CPS model. This early work tested the hypothesis that individuals exhibited behavior that could be interpreted through the CPS framework and that individual preferences could be observed in light of these behaviors. This was accomplished through observations of students and training program participants involved in CPS courses, as well as conversations with researchers in the field of creativity. Both observations and conversations clearly showed promise for this line of research.

Initial item creation began in the fall of 1992. Items were created by identifying the mental activities associated with each CPS stage. The question to be answered was, "What mental operations are unique to each stage of the CPS process?" It was important to identify these activities as they naturally occur and to use common language to describe what happens in each stage. In essence the goal was to get at the natural human behaviors that constitute each CPS stage. Thus, CPS was used as a framework to identify distinctly different problem solving behaviors that are naturally expressed by people.

Since FourSight would be used by people not trained in CPS, it was important to use non-technical language. For example, the items could not be based on specific CPS tools. References to tools, which represent learned behavior, would introduce technical language and defeat the purpose of measuring naturally occurring behavior.

The final consideration in the creation of the items was language that assessed style preferences and not ability. Statements had to be constructed in such a way as to get the respondent to consider whether he or she is drawn to a certain mental activity rather than whether he or she is good at engaging in that activity. In essence the focus was on determining aspects of the process to which individuals feel naturally predisposed.

The first item pool comprised 87 statements. An expert panel of six judges, graduate students versed in CPS, independently sorted the statements into the six CPS stages. Items for which 83% (5 of the 6 judges) agreed were retained. Sixty items met this standard. To achieve equal numbers of items per stage, four additional items that had 67% agreement were modified and placed into the pool. These statements were modified to more closely resemble the structure of the original 60 items that were deemed acceptable. Wheeler (1995) used the original 64 items to compare problem solving preferences to learning style and vocational interests. As an exploratory study Wheeler concluded that the problem solving preferences could be measured and compared to other psychological variables.

FourSight Versions

After the creation of the item pool, the statements were placed within the context of a paper-and-pencil self-report measure. At present, eight different versions of FourSight have been tested over a seven year period. Why so many versions? It was important to make sure that the measure was psychometrically sound, thus the progression from one version to the next represented continuous improvement efforts. Analysis of early versions of FourSight

focused on placing the items within an effective response scale. Once a response format was selected, attention shifted to analysis of the quality of the items and how the items clustered together (i.e., what themes emerged from an analysis of the relationships among the items). After the themes (also known as factors) emerged consistently across analyses, the focus narrowed to the identification of the best items.

The following section summarizes the developments that occurred across versions.

Version 1.0

Forty-eight items. Forced rank format. Respondents ranked items within sets. Six statements included in each set (i.e., an item for each of the six CPS stages). This version was only field tested.

Version 2.0

Fifty-four items. Forced rank format as above, however, each set contained items of a particular sort (i.e., either divergent, convergent, or conceptual statements). Data collected. Analysis highlighted drawbacks to forced ranking format. Format dropped.

Version 3.0

Fifty-four items retained, response scale changed to Likert (Very Strongly Disagree to Very Strongly Agree) scale. Data collected and factor analyzed (n=180). Four distinct themes emerged: conceptualizer (combination of mess-finding and idea-finding statements); implementer (combination of solution-finding and acceptance finding statements that were focused on moving ideas into action); problem analyzer (combination of data-finding and problem-finding items); and transformer (combination of solution-finding and acceptance finding items that were focused on refining ideas into workable solutions). FourSight compared to KAI, expected relationships emerged (e.g., n=138, conceptualizer / Proliferation of Originality r=.50, problem analyzer / Efficiency r=-.20). Items pruned (i.e., items that loaded only on one factor at .40 or greater, new items created based on the themes that emerged).

Version 4.0

Forty-three item measure field tested with small group. Slight modifications made. For example, response key changed to range from 'neutral' to 'very much like me.' Scale later modified to range from 'not like me at all' to 'very much like me.' Reverse items added to prevent response bias (i.e., negatively phrased statements).

Version 4.1

Fifty item measure. Data collected and analyzed (n=198). Five factors emerged. Same factors as found in version 3.0, except that data-finding and problem-finding items broke apart. Items pruned (i.e., statements with factor loadings above .30 retained). FourSight correlated with KAI and Basadur's measure. Majority of results in the expected directions (see Puccio, 1999).

Version 5.0

Forty-six item measure. Data collected and items analyzed (n=484). Factor analysis yielded four clear factors. Data-finding and problem-finding items loaded together. Factors named as follows: Clarifier, Ideator, Developer, and Implementer. FourSight correlated with KAI and MBTI. Results in the expected directions. Items with factor loadings of .30 or greater retained. Alpha coefficients also inspected, items detracting from overall scale reliability were eliminated.

Version 6.0

Thirty item measure. Data collected (n=296). Four factors emerged (see Table 2). Items loading .30 or better retained. A small number of items shifted to different scales. Some new items created. FourSight correlated with KAI. Results similar to previous studies.

Version 6.1

Thirty-six item measure. Nine statements for each of the four scales. This is the current version in use.

Development across the eight different versions of FourSight has focused on continuous improvement of the items. The items in a measure must be tight to make the measure useful. Therefore, painstaking effort has been invested in selecting the most robust items for FourSight. Without careful development, the use of FourSight as a research or applied tool would be severely limited.

How do you judge whether a psychological measures is of sufficient quality? There are two main criteria for judging a measure: reliability and validity. Reliability looks at a measure's consistency. Validity refers to the extent to which the measure actually assesses the variable(s) it was created to measure. If the items don't work, then it is difficult to gather solid evidence for a measure's reliability and validity. The following two chapters provide initial evidence that supports FourSight's reliability and validity.

Summary

FourSight is not a home grown measure. It has been developed over time and through rigorous steps. The measure has been carefully crafted to maximize its usefulness in both research and practice.

Chapter Three

Psychometric Properties: Reliability & Factor Structure

Introduction

Reliability is concerned with the consistency of the items contained within a measure. What is meant by consistency? Consistency refers to two main issues. The first is internal consistency (i.e., do the items within the same scale operate in the same way?). In other words, do respondents show similar responses across items designed to measure the same concept? The second is consistency over time (i.e., how similar are an individual's scores for the same scale at two points in time?). Reliability is the foundation to a good measure. If a measure shows no consistency then it is not useful for either research or applied uses. Just as you wouldn't trust a bathroom scale that registered a vastly different weight every morning, you should not trust a psychological measure that does not show consistency in measurement. The first serious question one must ask about any measure relates to whether the measure shows any evidence in regard to reliability. The purpose of this chapter is to answer this question with respect to FourSight.

Internal Consistency of FourSight

One standard method used to judge a measure's internal consistency is called the Cronbach alpha. Alpha coefficients over .70 are considered to be good. The alpha coefficients for FourSight (version 6.0) are found in Table 1.

Table 1 shows strong internal consistency for the four FourSight scales. Alpha coefficients for all four scales exceed .70.

Table 1
Internal Consistency of FourSight

FourSight Preference Scale (n)	Range in Item-Scale Correlation	Cronbach Alpha
Clarifier (n=296)	**.40 to .59**	**.78**
Ideator (n=293)	**.39 to .65**	**.81**
Developer (n=296)	**.42 to .60**	**.79**
Implementer (n=294)	**.43 to .73**	**.81**

Recent versions of FourSight have not been tested for consistency over time. An earlier version yielded positive significant relationships over a three-month period. The current version of FourSight needs to be examined in the same manner. Attention will be given to this issue in the future.

Scale Construction

How well do the items group together? One would expect that items from the same scales would cluster together when analyzed. Table 2 (page 16) shows the factor analysis results for FourSight Version 6.0. Factor analysis is a statistical method that identifies the themes found within a set of data. Items are said to load on a

factor (i.e., demonstrate how strongly they belong to and define that factor or theme). Factor loadings can range from 0 to 1. The higher the loading the more that item is said to define that factor. Only items that load greater than .30 are shown in Table 2 (.30 is commonly used as the convention to determine which items truly define a particular factor).

As can be seen from Table 2, five clear factors emerged from the analysis of FourSight (Version 6.0). In bold are the items with the highest loading for each factor. Again, the items with the largest loading help to define the nature of the theme captured by the factor. To assist with interpretation of the factors, the scales for which the items were theoretically designed to assess are noted in parentheses at the end of each statement.

Seven of the eight items that loaded on the first factor came from the Implementer scale. Factor two was comprised of only Ideator items. Seven items loaded on factor three, six of these items came from the Clarifier scale. The Developer items were split across the final two factors. Seven items loaded on factor five (four Developer items, two Clarifier items, and one Implementer item). The fifth factor was comprised of five Developer items. Slight modification were made to some of the Developer items for Version 6.1. The hope was to create a stronger qualitative link among the Developer items.

Table 2
Rotated Factor Solution for FourSight (Quartimax Rotation)

FourSight 6.0 Items (n=296):	Factor 1	2	3	4	5
Generally I don't approach problems in a creative manner. (Ideator)		*.31*			
I like testing and then revising my ideas before coming up with the final solution or product. (Developer)				*.58*	
I like taking the time to clarify the exact nature of the problem. (Clarifier)			*.46*	*.71*	
I enjoy taking the necessary steps to put one of my ideas into action. (Implementer)	*63*			*.38*	
I like to break a broad problem apart to examine it from all angles. (Developer)				**.66**	
I find it difficult to come up with unusual ideas to a problem. (Ideator)		*.37*			
I like identifying the most relevant facts to a problem. (Clarifier)				*.59*	
I like to explore the strengths and weaknesses of a potential solution. (Developer)				*.41*	*.62*
I enjoy coming up with unique ways of looking at a problem. (Ideator)		*.70*			
I like to generate all the pluses and minuses of a potential solution. (Developer)					**.67**
Before implementing a solution to a problem I like to break it down into steps.(Developer)	*.41*			*.47*	*.33*
Transforming ideas into action is not the part of the process that I enjoy most.(Implementer)	*.59*				
I like to generate criteria that can be used to identify the best option(s). (Developer)					*.59*
I enjoy spending time looking beyond the initial view of the problem. (Ideator)		*.66*			
I find that I don't naturally spend much time focusing on defining the exact problem to be solved.(Clarifier)			*.53*		
I like to take in a situation by looking at the big picture. (Ideator)		*.54*			
I enjoy working on ill-defined, novel problems. (Ideator)		**.73**			
When working on a problem I like to come up with the best way of stating it. (Clarifier)			*.66*		
I enjoy making things happen. (Implementer)	*.56*				
I like to focus on creating a precisely stated problem. (Clarifier)			**.72**		
I enjoy stretching my imagination to produce many ideas. (Ideator)		*.64*			
I like to focus on the key information within a challenging situation. (Clarifier)			*.56*		
I enjoy using metaphors and analogies to come up with new ideas for problems. (Ideator)		*.56*			
When it comes to implementing my ideas I find it difficult to bring my ideas to fruition.(Implementer)	*.57*				
I enjoy turning rough ideas into concrete solutions. (Implementer)	*.64*				
I like to think about all the things I need to do to implement an idea. (Developer) .	*.55*		*.33*		*.31*
I really enjoy implementing an idea. (Implementer)	**.83**				
Before moving forward I like to have a clear statement of the problem. (Clarifier)			*.69*		
I like to work with unique ideas. (Ideator)		*.66*			
I enjoy giving action to my ideas. (Implementer)	*.81*				

Summary

FourSight shows strong internal consistency within its four scales. Furthermore, items on these scales seem to group together fairly well when analyzed statistically. These facts are critical as they help provide confidence that the items that measure a particular preference, such as Ideator, actually operate in the same manner. The next chapter examines whether the four scales actually measure psychologically different constructs.

Chapter Four

Evidence for Validity: Does this Measure Really Work?

Introduction

Psychological measures must show evidence of their validity. Validity is concerned with whether a measure truly assesses what it says it measures. Without validity, a measure's usefulness is seriously compromised. In fact, a measure without validity is psychologically dangerous. Why? Measures are often used to draw meaning and make certain conclusions about people. If there is no evidence to support such assertions, then users are likely to give undue credence to the results. To use a medical analogy, the use of unsubstantiated diagnostic tools is akin to malpractice.

Validity can be assessed in a number of ways. The weakest form of validity, but perhaps the one that is most often used by lay people, is 'face validity.' Face validity refers to meaning that we assign to a measure based on its appearance (i.e., how well it is packaged, the designers reputation, the psychological hook created through engaging feedback, etc.). The package looks good so the measure must be good. There are much more scientific and meaningful ways of establishing validity. These approaches include: examining related literature to analyze whether the construction of the measure represents the main constructs identified in the literature (i.e., content validity); comparing a newly developed measure against well-established measures to see if expected relationships appear (i.e., concurrent validity); or using the scores derived from a measure to predict future performance or behavior (i.e., predictive validity). To date, FourSight research has focused on the issue

of concurrent validity. The purpose of this section is to summarize the evidence collected so far that supports the concurrent validity of FourSight. These studies have come in two forms: first, comparisons with established measures; second, an examination of reactions to Creative Problem Solving training. Evidence gathered so far shows strong support for FourSight's validity.

Comparisons to Established Measures

As of the publication of this manual FourSight has been compared to four already established measures. They are:

1) The Kirton Adaption Innovation Inventory
(Kirton, 1976; 1994)

2) The Creative Problem Solving Profile Inventory
(Basadur, Graen, & Wakabayashi, 1990)

3) The Myers-Briggs Type Indicator
(Myers & McCaulley, 1985)

4) The Adjective Check List
(Gough & Heilburn, 1983)

The following sections review briefly the results of comparisons to each of these measures.

Kirton Adaption Innovation Inventory

The Kirton Adaption Innovation Inventory (KAI) is a measure of creativity style. Introduced in 1976 by a British researcher named Michael Kirton, the KAI has been widely researched and used in applied settings. The KAI measures the way in which people express their creativity, known as creativity style, not their capacity or potential to be creative. Total scores on the KAI, which range from 32 to 160, place respondents on a continuum that runs from an adaptive orientation to an innovative one. Adaptors express their creativity by working within the system. They find ways to continuously improve the existing paradigm. Innovators by contrast, are said to create in a more radical and threatening manner as their ideas tend to challenge existing paradigms. Their creativity can be said to be discontinuous as it breaks with the past. Both styles are creative, they simply represent different ways of being creative.

The KAI total score is comprised of three distinct sub-traits. The first is called Sufficiency of Originality (SO) and is concerned with the degree to which an individual prefers to proliferate original ideas. Adaptors tend to produce a small number of original responses to problems and then focus on moving the ideas forward. Innovators, on the other hand, prefer to toy with ideas and generate many possibilities. The second sub-trait is called Efficiency (EFF). This sub-trait focuses on individuals' preferences to be methodical, systematic, and thorough. Adaptors show these tendencies while innovators find it more challenging to focus on the details. The final sub-trait is Rule/Group Conformity which relates to the extent to which an individual respects authority, seeks to follow the rules, and conforms to prevailing thought. Adaptors prefer to conform to rules and authority. Innovators resist conforming and are therefore more independent minded. On all three KAI subscales innovators receive higher scores than adaptors (just as with the total score).

Given its focus on creativity style and its well established research record, the KAI was used as a continuous point of comparison throughout the development of FourSight. Table 3 provides a summary of the correlations yielded through comparisons of various versions of FourSight against the KAI.

Table 3
Correlations between FourSight & the KAI

FourSight Preference Scale (n)	KAI Variables Total Score	SO	EFF	RGC
		FourSight Version 3.0		
Clarifier (n=138)	.03	.28***	-.20**	-.11
Ideator (n=141)	.36***	.50***	.04	.20*
Developer (n=138)	.09	.30***	-.16	-.03
Implementer (n=138)	.21*	.35***	-.03	.10
		FourSight Version 4.1 (see Puccio, 1999)		
Collector (n=57)a	.10	.37**	-.09	-.11
Clarifier (n=57)	-.13	.22	-.24	-.29*
Ideator (n=57)	.44***	.76***	-.09	.06
Developer (n=57)	-.11	.23	-.32*	-.27*
Implementer (n=57)	.12	.40**	-.11	.11
a Collector Scale was later combined into Clarifier scale for Version 6.0 and beyond				
		FourSight Version 5.0		
Collector (n=146)a	-.05	.12	-.12	-.06
Clarifier (n=145)	-.22**	-.07	-.23**	-.06
Ideator (n=147)	.42***	.43***	.18*	.42***
Developer (n=145)	-.28***	-.03	-.36***	-.11
Implementer (n=145)	-.06	.12	-.19*	.01
a Collector Scale was later combined into Clarifier scale for Version 6.0 and beyond Factor analysis resulted in Collector and Clarifier items combining				
		FourSight Version 6.0		
Clarifier (n=86)	-.14	.02	-.37***	-.08
Ideator (n=86)	.53***	.64***	.18	.27*
Developer (n=87)	-.03	.12	-.32**	-.07
Implementer (n=87)	.08	.21(p=.055)	.15	.08

* p < .05; ** p < .01; *** p < .001

In reviewing the correlations between the KAI and various versions of FourSight, several consistent results are apparent. First, it is clear that the Ideator scale has a strong positive relationship with total score on the KAI. This positive relationship indicates that, as preferences for Ideator increase, the respondents also show an increased preference for Kirton's innovative style. This relationship cuts across all subscales, but is most prominent for the Sufficiency of Originality subscale. This would be expected as both measures describe a person who enjoys generating ideas. Second, on three of the four FourSight versions tested against the KAI, Clarifier produced a moderate negative relationship with Kirton's Efficiency scale. This negative relationship indicates that as scores for Clarifier go up, scores for the Efficiency subscale go down (lower scores indicate a preference to be efficient). This makes theoretical sense as clarifying the problem would seem to be related to a focus on being thorough, methodical, and precise. Third, on the most recent three versions, Developer produced a moderate negative relationship with the Efficiency scale. As with Clarifier, it would seem reasonable to expect that for ideas to be evaluated and refined into workable solutions, there would be an increased preference to be thorough and methodical.

In summary, comparisons between FourSight and the KAI revealed three consistent results. These results show that FourSight is not biased towards one of Kirton's creativity styles (i.e., neither adaptor or innovator style) to the exclusion of the other. This is critically important as both the adaptive and innovative styles are equally valuable ways of expressing creative ability; therefore FourSight must be sensitive to both. Furthermore, if one believes that all people have the capacity to engage in the creative process, then both styles should have a home in the preferences measured by FourSight. What is interesting to note is that different aspects of the creative process appear to be more natural to either the adaptor or the innovator. Again, innovators appear to be drawn to ideation, while adaptors seem to have more energy for clarifying problems and refining solutions.

Myers-Briggs Type Indicator

One of the most popular measures of personality is the Myers-Briggs Type Indicator (MBTI; Myers & McCaulley, 1985). The MBTI is based on the work of Carl Jung and is a measure of psychological type. There are four dimensions that are assessed by the MBTI. Extraversion-Introversion looks at a person's orientation to either the outer world (extraversion) or the inner world (introversion). Sensing-Intuition examines how people prefer to take in information. Sensing types like to work hands-on while Intuitives prefer to work with impressions. The third dimension, Thinking-Feeling refers to the way in which people make decisions, either in an objective (Thinking) or in a subjective manner (Feeling). The final dimension Perceiving-Judging examines how people structure their lives. Perceiving types live a more open life style, going with the flow, while Judging types prefer order and structure.

Version 5.0 of FourSight was compared to the MBTI (Form G). Correlation coefficients appear in Table 4. Four correlation coefficients were significant. Three of these relationships were generated by the JP dimension on the MBTI. This dimension showed a negative relationship with Clarifier and Developer. This indicates that the high Clarifiers and Developers tend to express a preference for the Judging type measured by the MBTI. Judging types enjoy being decisive: they like to establish closure, have clear limits, and plan in advance. These qualities would seem to fit the Clarifier and Developer preferences. Both Clarifiers and Developers have a focused quality about them. Where Clarifiers bring structure and focus to the analysis of a problem, Developers bring structure and focus to the analysis of potential solutions. The third significant coefficient produced by the JP dimension showed a positive relationship with the Ideator preference. This would indicate that the Perceiving type is more likely to report a preference for ideation. Perceiving types live a flexible life style and enjoy exploring opportunities without limits. Perceiving types are described as spontaneous, curious, and flexible. These qualities seem to coincide with the function of ideation within the creative process. Ideator also correlated with the SN dimension. In fact, the coefficient here ($r = .68$) showed a strong positive relationship which

indicates that Intuition relates strongly to the Ideator preference. Intuitive types are described as future focused, concerned with possibilities, innovative, imaginative, and drawn to change. These characteristics seem to be quite descriptive of an individual whose preference within the creative process is to play with ideas. In summary, it seems that the relationships that emerged between the MBTI and FourSight are quite easily interpreted and appear to be theoretically expected. This sample was small; future research needs to replicate the comparison between these two measures.

Table 4
Correlations between FourSight & the MBTI

	MBTI Dimensions (n=53)			
FourSight Preference Scale	**E-I**	**S-N**	**T-F**	**J-P**
FourSight Version 3.0				
Clarifier	**.20**	**-.26**	**-.16**	**-.52*** **
Ideator	**-.04**	**.68*** **	**.21**	**.33***
Developer	**.22**	**-.17**	**-.22**	**-.54*** **
Implementer	**-.21**	**-.03**	**-.05**	**-.11**

Creative Problem Solving Profiling Inventory

Basadur, Graen, and Wakabayashi (1990) developed a paper-and-pencil inventory that assesses different preferences for Basadur's eight stage version of the CPS process. Thus, their measure, called the Creative Problem Solving Inventory (CPSP), has a similar purpose as to FourSight. However, the similarities stop there. Where FourSight uses statements that describe specific activities associated with the four preferences, the CPSP has respondents rank sets of words (i.e., four words ranked within each set).

Where FourSight is based on the theoretical assumption that the CPS process represents a series of mental activities and that people will express different preferences for these mental activities, the CPSP takes quite a different approach. The CPSP is based on the assumption that two information processing dimensions relate to progression through Basadur's version of the CPS process, called SIMPLEX. The first dimension is focused on how people gain knowledge, either through direct concrete thinking or through detached abstract thinking. The second dimension relates to how people use knowledge. Knowledge can be used for ideation or for evaluation. Basadur asserts that these two dimensions are perpendicular and when they cross they form four quadrants. Quadrant I, concrete experience with ideation, is referred to as the Generator style. The Generator is said to prefer the Problem Finding and Fact Finding stages of CPS. Quadrant II, abstract thinking and ideation, is called the Conceptualizer. The Conceptualizer is hypothesized to enjoy the Problem Definition and Idea Finding stages. Quadrant III, abstract thinking and evaluation, is referred to as Optimizer. The Optimizer is said to prefer Evaluation and Selection, as well as the stage Basadur refers to as Plan. Quadrant IV, concrete thinking with evaluation, is known as Implementor. Implementor relates to the Gain Acceptance and Action stages of the Basadur's version of the CPS process.

Table 5 shows the correlation matrix produced by FourSight and CPSP. Three of the comparisons were significant. FourSight's Ideator produced two significant correlations, one positive the other negative. Ideator was significantly related to Conceptualizer,

which makes sense as Basadur suggests that Conceptualizer enjoys the Idea-Finding stage of CPS. Ideator produced a negative relationship with Basadur's Implementor style. This seems quite reasonable as an individual caught up in producing ideas and constantly toying with options may find it difficult to commit to a single course of action. The third significant coefficient was produced by the Implementer preference and Basadur's Optimizer style. According to Basadur the Optimizer style enjoys evaluating solutions and putting together a plan of action. There seems to be a conceptual link between these two variables, particularly the focus on developing a plan to carry a solution forward.

Table 5
Correlations between FourSight & the CPSP

	CPSP Preferences (n=36)			
FourSight Preference	**Generator**	**Conceptualizer**	**Optimizer**	**Implementor**
Scale				
FourSight Version 4.1				
Clarifier	**-.21**	**-.14**	**.08**	**.09**
Ideator	**-.08**	**.37***	**.12**	**-.46****
Developer	**-.26**	**-.03**	**.05**	**-.13**
Implementer	**.08**	**-.28**	**-.40***	**-.06**

Despite the small sample size (n=36) the analysis yielded results that reflect conceptual connection between Basadur's CPSP and FourSight. However, given the size of the sample replication with a larger number of research participants is necessary.

Adjective Check List

To develop a deeper understanding of the personality make up of the four preferences measured by FourSight (Rife, 2001) compared this measure to the Adjective Check List (ACL; Gough & Heilbrun, 1983). The ACL was developed as part of the studies into the creative personality conducted at the Institute of Personality Assessment and Research. Thus the origins of the ACL go back to 1949. The ACL contains 300 adjectives. Respondents are asked simply to check the adjectives they feel are descriptive of themselves. The 300 adjectives form 37 different scales. In Rife's analysis, only the scales that appeared to be useful in developing further insights into the four FourSight preferences were used. Others, for example, military leadership, counseling readiness, critical parent, etc., were excluded. Table 6 shows the correlations that were produced by comparing the 25 ACL scales to the four FourSight preferences. (Version 6.1, the current FourSight was used in this study.) The four FourSight preferences were also compared to age and gender, and no significant relationships were found.

Forty-nine of the correlations between FourSight and the ACL were significant. To interpret these results, we begin with the ACL scales that were related significantly to all four FourSight preferences. Afterwards each FourSight preference is taken in turn and examined in light of its relationships with various ACL scales.

ACL scales that significantly correlated with all four FourSight preferences were: Favorable, Achievement, Creative Personality, Self Confidence, and Succorance. Individuals with high scores across all four preferences can be described as follows: adaptable; aware of own strengths; strive to be outstanding in all pursuits; highly creative; confident in their ability to achieve goals; and not dependent upon emotional support from others. Taking these characteristics together it would seem that high scores across all four FourSight preferences would be a good indicator of well-being. High scorers may reflect a problem-solving and creative-thinking orientation to the world. These individuals may therefore have greater coping skills and may be in a better position to respond to life's challenges. As a result of their strong problem solving preferences they may

Table 6
Correlations between FourSight & the ACL

ACL Scales	FourSight Preferences (n=134) Clarifier	Ideator	Developer	Implementer
	FourSight Version 6.1			
Total	.06	.26**	.08	.02
Favorable	.20*	.44***	.23**	.17*
Unfavorable	-.05	-.01	-.09	-.10
Feminine	-.08	.15	-.05	-.10
Masculine	.12	.30***	.11	.18*
A1 Scale	.08	.29***	.10	.04
A2 Scale	-.05	.37***	.02	-.01
A3 Scale	.00	.10	.02	-.01
A4 Scale	.19*	.25**	.24**	.13
Abasement	-.11	-.34***	-.06	-.31***
Achievement	.18*	.44***	.25***	.35***
Affiliation	.09	.28***	.10	.04
Aggression	-.06	.13	-.11	.14
Autonomy	.01	.36***	-.03	.21**
Change	-.02	.49***	-.03	.17*
Creative Personality	.23*	.69***	.28***	.27**
Dominance	.11	.40***	.10	.33***
Endurance	.21*	.14	.30***	.23**
Exhibition	.05	.37***	.00	.15
Intraception	.25**	.39***	.31***	.16
Nurturance	.01	.06	.05	-.03
Order	.23**	.03	.31***	.18*
Self Confidence	.20*	.53***	.22**	.29***
Self Control	-.03	-.34***	-.00	-.18*
Succorance	-.24**	-.36***	-.26**	-.31***

possess an internal locus of control, feeling that success does not result from chance and that opportunities are created through one's own efforts.

From a creativity research perspective, what is most notable among the scales that related across all four preferences was the relationship with the Creative Personality scale. This scale emerged out of studies conducted at the Institute of Personality Assessment and Research. The adjectives on this scale were able to discriminate between groups of individuals who were socially recognized as being highly creative from groups that were judged to be less creative. The good news here for FourSight is that all four preferences were related to high levels of creative ability. This makes theoretical sense as, in order to achieve high levels of creative productivity, one would need to master all aspects of the creative process.

The Clarifier preference correlated significantly with Endurance, Intraception, and Order. Endurance refers to a person who persists in any task undertaken. This scale also related to Developer and Implementer. It would seem that the parts of the process that require persistence would be the energy required to analyze the problem space (Clarifier), the effort necessary to refine an idea into a workable solution (Developer), and the dedication to see a solution through to fruition (Implementer). It is interesting to note that Ideator was not related to Endurance, which may indicate that a potential challenge for someone who enjoys ideation is seeing one idea through to conclusion. Intraception refers to attempts to understand one's own behavior or the behavior of others. This scale also correlated significantly with Ideator and Developer. Order refers to a focus on neatness, organization and planning. This ACL scale also correlated significantly with the Developer and Implementer preferences.

Five of the ACL scales yielded significant relationships with the Ideator preference alone. They were Total, A1 Scale (High Origence, Low Intellectence), A2 Scale (High Origence, High Intellectence), Affiliation, and Exhibition. The AI and A2 scale relationships appear to be driven by the creativity component found within both scales. Here creativity refers to a capacity to think

imaginatively, to bring ideas into being, to influence one's environment through aesthetic criteria, to discern the underlying elements of order in disorder, and to make sense out of nonsense. Given this definition of creativity it would seem as though the Ideator preference would more clearly embody these characteristics than the other three preferences. Affiliation refers to a person who seeks to maintain numerous personal friendships. Higher scorers on this scale can be described as people who are comfortable in social situations, like to be with others, adapt easily to the changing demands of group process, gloss over inner complexities, and take people at face value. Exhibition refers to a person who behaves in a way that draws immediate attention. Some of the adjectives associated with this scale are active, adventurous, aggressive, assertive, daring, energetic, forceful, humorous, headstrong, impatient, impulsive, restless, spontaneous, and versatile. High scorers on the Masculine scale are described as taking initiative, being forceful and stretching the limits. These traits seem to fit readily with the Ideator.

Six of the ACL scales yielded significant relationships for both the Ideator and Implementer preferences, indicating that these two FourSight preferences share some common characteristics. ACL scales that related to both Ideator and Implementer were Abasement, Autonomy, Change, Dominance, Masculine and Self-Control. Abasement and Self-Control were correlated negatively with the two FourSight preferences. Therefore, high scorers on the Ideator and Implementer preferences could be described as people who are not likely to express feelings of inferiority through self-criticism and whose narcissistic claims often lead to broken rules and altercations. Adjectives that appear to be descriptive of the high Ideator and Implementer are adventuresome, aggressive, ambitious, demanding, determined, dominant, opportunistic, mischievous, rebellious, self-seeking, stubborn, tough, and uninhibited. Autonomy, Change, Dominance and Masculine were all positively correlated with Ideator and Implementer. Taken together these scales indicate that high Ideators and Implementers are independent minded, initiate change, seek to influence others, and are forceful.

The remaining relationship that has not been explored yet is the relationship between A4 scale (Low Origence, High Intellectence) and FourSight. The A4 scale correlated with Clarifier, Ideator, and Developer. High scorers are drawn to intellectual activity. Perhaps the Implementer did not significantly correlate with this scale given this preference's orientation towards action, and as such may have less tolerance for intellectual concerns.

CPS Training as Viewed through FourSight Preferences

FourSight was created to identify how people interact with the creative process, particularly as this process is defined through the CPS framework. Given this proposition, it would seem as though FourSight would be useful in helping us to understand how individuals respond to CPS training. Wheeler (2001) set out to examine if FourSight preferences would distinguish how students responded to a course in CPS.

At the end of the course Wheeler asked students, both undergraduate (n=11) and graduate (n=73), to evaluate the course by identifying how much they enjoyed learning aspects of CPS and how valuable they believed the various aspects of CPS would be for them in the future. Wheeler's analysis showed that people with different FourSight preferences responded quite differently to the same course content. For example, in general Wheeler found that learning divergent thinking was the most enjoyable and valuable aspect of the course; however, when examined through FourSight lens what he found was that Ideators considered certain aspects of divergent thinking to be the least enjoyable and least valuable parts of CPS.

Tables 7 through 10 summarize the key differences among the four FourSight preferences. Nonparametric analysis (e.g., Kruskal-Wallis one-way ANOVA, Mann-Whitney U) was used to identify statistically significant differences. Only statistically significant differences are reported here.

Table 7
CPS Training and Clarifiers

FourSight Preference	Enjoyed	Did Not Enjoy
High Clarifiers	Explore the Challenge Component Defer Judgment Principle Ladder of Abstraction Tool	Check Your Objectives Principle Stick 'em up Brainstorming Tool
Low Clarifiers	Plan for Action Stage	ID Goal, Wish, Challenge Stage
	Found Valuable	**Did Not Find Valuable**
High Clarifiers	Identify Goal, Wish, Challenge Stage	Brainwriting Tool Visual Connections Tool

High Clarifiers said they enjoyed the Ladder of Abstraction, which is a tool that helps to systematically analyze the problem space. This would seem to make sense since the Clarifiers have a preference for exploring problems. It is interesting to note that they believed that the Identify Goal, Wish Challenge Stage would be useful for them in the future. This stage falls within the Exploring the Challenge component of CPS. However, it specifically calls the problem solver to look at the bigger picture and more global issues. Therefore, this stage might help prevent Clarifiers from getting lost in the details of the problem.

Table 8
CPS Training and Ideators

FourSight Preference	Enjoyed	Did Not Enjoy
High Ideators	Itemize Evaluation Tools (i.e., PPCO) Word Dance Tool Affirmative Judgment Principle	Generate Ideas Component Defer Judgment Principle Brainstorming Tool Brainwriting Tool Evaluation Matrix Tool
Low Ideators	Select & Strengthen Solution Stage Identify Goal, Wish, Challenge Stage	

	Found Valuable	Did Not Find Valuable
High Ideators	Itemized Evaluation Tools (i.e., PPCO) Affirmative Judgment Principle	Generate Ideas Component Generating Ideas Stage Strive for Quantity Principle Seek Wild & Unusual Ideas Principle Brainstorming Tool Brainwriting Tool
Low Ideators		Visual Connection Tool

What is striking about the Ideator results is that four of the five elements they enjoyed least were related to divergent thinking. It may be that Ideators don't enjoy learning formal methods for divergent thinking as this already comes naturally to them. Not surprising all six items that they believed would not be useful for them in the future were related to divergent thinking. Another intriguing finding for Ideators relates to evaluation tools. They enjoyed the more

Table 9
CPS Training and Developers

FourSight Preference	Enjoyed	Did Not Enjoy
High Developers	Explore the Challenge Component Identify Goal, Wish, Challenge Stage Affirmative Judgment Principle	Seek Wild & Unusual Ideas Principle Brainstorming Tool Stick 'em up Brainstorming Tool Brainwriting Tool Forced Connections Tool Evaluation Matrix Tool
Low Developers	Generate Ideas Stage	Clarify the Problem Stage
	Found Valuable	**Did Not Find Valuable**
High Developers	Ladder of Abstraction Tool Itemized Evaluation Tool (i.e., PPCO) Affirmative Judgment Principle	Generate Ideas Component Stick 'em up Brainstorming Tool Brainwriting Tool Strive for Quantity Principle Seek Wild & Unusual Ideas Principle Build on Ideas Principle
Low Developers		Defer Judgment Principle

intuitive itemized evaluation tools (i.e., POINt, PPCO, LCOb, etc.), but not the more analytically oriented evaluation matrix.

Developers seemed to enjoy and find more value in the more analytical elements of CPS, such as the Exploring the Challenge component and the Ladder of Abstraction tool. Like Ideators, they did not enjoy learning the divergent elements of CPS and saw less value there, though perhaps for different reasons.

Table 10
CPS Training and Implementers

FourSight Preference	Enjoyed	Did Not Enjoy
High Implementers		
	Plan for Action Stage	Forced Connections Tool
	Found Valuable	**Did Not Find Valuable**
Low Implementers		
		Defer Judgment Principle

Implementers were the only group who found learning the Planning for Action stage to be enjoyable. Interestingly, few of the CPS elements stood out for the Implementers. In some ways this is not surprising since the Implementers have less patience for the creative process. Process takes too long. They wish to get to action. This may be reflected in the results as they process content of these college courses may have not resonated strongly for the Implementers.

Summary

FourSight shows significant correlation with four highly reputed psychological measures, giving evidence of its validity. Of course, more research must be done to ensure its validity and to explore broader applications for its use.

Conclusion

Final Thoughts

FourSight, as evidenced through the analysis presented herein, shows much promise as a tool for identifying individual differences with respect to the creative process. Data collection is ongoing, thus continuous improvement and understanding is still sought in terms of FourSight. Version 6.1 is the current measure in use. Data has been collected on more than 300 respondents and many more FourSights have been used in training programs. FourSight has been used as a way of introducing training participants to the CPS process, as a centerpiece in supervisory training, and for team building. Insights gained through the application of FourSight are many. It is not unusual, for example, to have colleagues comment on how FourSight helped them to develop a deeper appreciation for their work relationship.

In a field that features many "home grown" measures, FourSight is beginning to show clear signs of both research support and practical benefits. As FourSight continues to be used and analyzed, the technical manual will be updated so that current information will be available to users.

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