

Characterizing High-frequency Coincidence Detectors

Stephanie L. Coleman; and Bernard D. Beitman, MD

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CME EDUCATIONAL OBJECTIVES

1. Describe the statistical and personality variables that influence detection of coincidence.
2. State that high frequency coincidence detectors may be self-referential or vital.
3. Recognize that characteristics including intense emotion, faith in intuition, search for meaning, and religious commitment predispose people to detect coincidences.

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Ms. Coleman and Dr. Beitman have disclosed no relevant financial relationships.

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EDUCATIONAL OBJECTIVES OVERVIEW

We tend to be delighted, surprised, or puzzled by coincidences that happen to us (but not so much to others, which we tend to explain as merely a coincidence). The series of articles on the experience of reacting to coincidences provides a different window into how our brains and minds work. Perhaps when explanatory models about weird coincidence experiences become dysregulated, psychopathology (eg, paranoia) can result.

Note that in the Beitman article, the story about John Snow finding that the Broad Street pump was the cause of a cholera outbreak, although quite interesting, may not be as true as most might think. By mapping the outbreak, Dr. Snow identified the pump as the cause of cholera. He removed the pump, and the cholera epidemic diminished. But as detailed by Tufte, the rate of cholera was decreasing before the water pump was removed, which is a good example of finding a relationship where one did not necessarily exist.

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The experience of meaningful coincidence has been reported throughout time and different cultures. Stories involving coincidence appear in movies, song, and literature. Popular attention to coincidence also has been increasing. Meaningful coincidence is defined informally; these experiences range from having dreams

come true to running into someone you've just thought about. Synchronicity is related to meaningful coincidence, and is defined as an external state (eg, experiences) that matches an internal state (eg, thoughts, feelings).

In an attempt to quantify the increase in interest in meaningful coincidence and synchronicity, we informally

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TABLE 1.

WCS-2 Interpersonal and Agentic Items

Interpersonal	Agentic
I think of calling someone, only to have that person unexpectedly call me.	I need something, and the need is met without my having to do anything.
When my phone rings, I know who is calling (without checking the cell phone screen or using personalized ring tones).	I advance in my work/career/education through being at the "right place-right time."
I think of a question only to have it answered by external media (ie, radio, TV, people) before I can ask it.	I am introduced to people who unexpectedly further my work/career/education.
I think of an idea and hear or see it on radio, TV, or internet.	Meaningful coincidence helps determine my educational path.
I think about someone and then that person unexpectedly drops by my house or office or passes me in the hall or street.	After experiencing meaningful coincidence, I analyze the meaning of my experience.
I run into a friend in an out-of-the-way place.	
I experience strong emotions or physical sensations that were simultaneously experienced at a distance by someone I love.	

searched for books and articles across several decades about synchronicity through internet sources using "synchronicity" as the key word. The results showed about four publications per year in the 1970s while there was an average of around 10 publications per year through the 1990s and the 2000s. Despite the ongoing interest in and increasing coverage of coincidences and synchronicity, there have been few scientific investigations of the topic, particularly with respect to placing coincidences within academic disciplines (eg, anthropology, sociology, psychology, theology, mathematics, or physics).

Jung was among the first to study meaningful coincidences by coining the term "synchronicity" to refer to what has become a subset of the broad category of meaningful coincidences.¹ Although his definitions varied, his primary definition concerned coincidences that promoted psychological development (see Hopcke, page 287). Jung's work first stimulated much activity within his field of Analytical Psychology, but subsequently several other disciplines have since taken notice. Since Jung's work, writing about synchronicity and coincidences within other branches of psychology, especially career counseling, has increased.

Potential explanations for an increase in the study of coincidence are many: some point to the current mainstream philosophical thought (ie, the shift to postmodern thinking).² Others point to the shift from a materialistic stance to one centered on relationships and spirituality.² These cultural shifts in mainstream thinking may also represent a deviation from the traditional scientific paradigm of causal thinking. The increasing cultural significance of coincidence provides another justification for its scientific study.

Beyond the global increased interest in coincidences, specific cases of coincidences are impacted by a variety of factors. For example, coincidences are impacted by probabilities, both of the events themselves and the overall probability of coincidences. They are also impacted by an individual's unique history, personality, and circumstances.

Coincidence experiences can be partially explained by probability variables. In a large population, low-probability events are likely to occur, although individuals tend to believe their own coincidences are more rare and more important.³ Let's say that incredible coincidences happen daily to only 1 person in 1 million people. That would

mean, therefore, that the 300 million people in the United States would experience 300 incredible coincidences per day or 109,500 (300 x 365) incredible coincidences per year.

The incidence of coincidences is also impacted by base rates or frequencies of the events involved in coincidences. Each event occurring in parallel may be more or less likely to occur, in general. Coincidences surrounding pain or death are less likely to occur than coincidences surrounding dreams or phone calls, because dreams and phone calls are more common; they have higher base rates than death and/or pain.

The reporting of coincidences is also influenced by broader cultural factors. Internal thoughts are affected by our shared experiences. Because the environment in which we live is heavily permeated by various media (eg, television, internet, print) as a means of distributing thoughts and ideas, our own thoughts are directly influenced by the media. Others in our environment are also simultaneously influenced by the same media influences. Thus, the probability of one person thinking a thought that is similar to another person's thought is increased by our shared exposure to the media.

As shown in the previous report on the Weird Coincidence Scale (see Coleman, Beitman, Celebi, page 265), the experience of meaningful coincidence is relatively common. Many individuals use these coincidences as a means for guiding decisions and feeling connected to other people. The recognition of the commonness of these experiences provides another justification for the study of coincidence. Because many people notice these events and derive some sort of meaning from them, they are relevant events that impact behavior.

Although many people detect meaningful coincidences, there is a subset of people who notice more of them, derive more meaning from them, and look to them as a primary source of guidance (we call them “high-frequency responders”). These individuals may receive wide characterizations, from being spiritually in-touch to being mentally ill. However, we know little about these individuals in general (ie, for instance, we may hypothesize about the kinds of personality characteristics that are associated with high-frequency responders, although there is no supporting evidence). Moreover, given that high-frequency responders may be characterized as being “crazy” for excessively seeking and relying on coincidences, psychiatrists need to know other qualities of these individuals in order to help place them on the continuum of normal and pathological traits.

Knowledge of the range of how coincidences can be perceived will help psychiatrists to differentiate between those individuals who are intensely seeking and relying on coincidences from those who experience coincidence in a more normative manner. For those experiencing coincidence in a normative manner, psychiatrists can validate the experience as being normal, offer reassurance that these interpretations of experiences are not signs of mental illness, and be able to guide the individual to the potential

APPENDIX.

Prototypical Coincidence Scenario

Please read the following story as an example of meaningful coincidence.

“Kelly is a 28-year-old female member of Alcoholics Anonymous. She was struggling with a great deal of anger and resentment focused on her father, an active alcoholic with whom she has been with from 10 years. She described their relationship as one of emotional turmoil and ‘dysfunctional.’

One day, as she was reading the text, Alcoholics Anonymous, she came across a passage that described alcoholics as sick people and how we would not treat a cancer patient or someone suffering from another serious medical illness with disdain and resentment. She suddenly had this ‘revelation’ about her father and felt the anger and resentment melt into empathy.”

usefulness of coincidence (see Hopke, page 287, and Nachman, page 297). Individuals receiving therapeutic services may also be more likely to report their use of coincidences when these experiences are validated as normal and potentially useful.

A coincidence itself, in the way we define it, is the co-occurrence of an internal thought or state and an external event within a short period of time. Whether or not a coincidence will be considered “meaningful” is strongly influenced by an individual’s specific circumstances (eg, history, cognitive style, emotional state). An individual may be more likely to experience coincidences in times of great emotional distress or in times of peak positive emotional states.⁴ An individual’s history and personal characteristics, such as their relationships with others and their tendency to formulate spiritual explanations for life events, likely will impact the reporting of coincidences.

Although we theorize about the individual characteristics that lead to high-frequency detection of coincidences, the empirical validity of these questions is still undetermined. Moreover, given the many individuals experiencing these events relative to the amount of research devoted to the question, the authors believed an improvement of methods was desired. The purposes of the study were twofold: first, we wished to identify personality factors relating to high fre-

quency responders; second, we wished to continue to refine and evaluate the psychometric properties of a self-report scale on coincidences. The Weird Coincidence Survey (WCS-1) reported in Coleman et al (see page 265) suggested a need for a shorter, more psychometrically sound Weird Coincidence Scale (WCS-2), which could be used to study, among other questions, the psychological variables associated with high frequency coincidence detectors. It is hoped that as a result of the use of the WCS, the discourse on coincidence will widen by both sharpening its psychometric qualities and broadening its use for research by not only psychiatrists, but also social and counseling psychologists, philosophers, and individuals studying spirituality and religion.

Toward the goal of developing a more psychometrically sound scale, we conducted a series of statistical tests to refine the WCS-1. Steps in scale development require that first an exploratory factor analysis (EFA) be performed on the initial survey items. An EFA requires a series of statistical steps that define clusters of items that hang together. In addition, each cluster must be statistically independent of each other cluster. The clusters are then called factors. The factors measure particular subsets of the general idea. For example, a scale measuring depression can have a subset or factor that measures hopelessness. Study 1 describes the EFA.

SIDEBAR.

Analysis and Interpretation Items Administered with the WCS-2

I feel that meaningful coincidences point to a connection between my internal and external worlds.

I believe that human minds are interconnected.

I believe fate works through meaningful coincidences.

I believe God speaks to us through meaningful coincidences.

Meaningful coincidences help me grow spiritually.

I believe coincidences can be explained by the laws of probability or chance.

STUDY 1: EXPLORATORY FACTOR ANALYSIS

Methods

Participants

A total sample of 681 individuals participated across two data collections. Demographics from the two samples are comparable and are combined across both data collections. Demographic information was not collected from all participants; available demographic information is reported as follows. For those reporting age ($n = 634$), the mean age was 28.6 ($SD = 11.2$). For those reporting gender ($n = 634$), 18.1% were male and 81.9% were female. For those reporting their racial background ($n = 636$), 89.8% were white, 2.8% were Asian, 1.7% were black, and 1.4% were Hispanic. This sample is more fully described in (Coleman, Beitman, Celebi, see page 265).

Measures

The Weird Coincidence Scale (WCS)

The WCS is described in more detail in Coleman, Beitman, Celebi (see page 265). Participants were given a scenario describing a prototypical coincidence. They were then asked a series of 36 questions to determine the frequency with which they experience meaningful coincidences (“I am in the right place at the right time to rescue somebody”). These

responses are on a 5-point Likert scale from “None/Never” to “Very Much/Frequently”. These items comprise the “Total WCS” score. A second set of six items that address the analysis and interpretation of meaningful coincidences (“I believe fate works through meaningful coincidences”) was also included. Response options were on a 5 point Likert scale from “Strongly Disagree” to “Strongly Agree.”

Results

An initial exploratory factor analysis was performed on the total WCS given to participants. An item pool of 36 items was administered to participants. Following examination of the scree plot, it was determined two factors would be retained.

Items were deleted on the basis that: 1) they received very low observed endorsement and were not judged as essential to the conceptual definition of the construct; 2) they had low communalities ($< .30$); and 3) their absence would promote simple structure (ie, minimize cross-factor loadings).

These results indicate a two-factor solution, comprised of an interpersonal scale and an Agentic scale. The two factors with their corresponding items are shown in Table 1, see page 272). The interpersonal factor was so named because the items in the factor primarily dealt with coincidences involving oneself in relation to others, such as an internal thought of a person, idea, or feeling being manifested externally.

The Agentic factor deals with coincidences mainly revolving around action. In these types of coincidences, some movement is accomplished. For example, an individual may receive an advancement in their work, have a need met, or find they can analyze coincidences. In each case, action toward a specific aim is involved in the coincidence experience. The two scales generated from this analysis were combined and labeled in the WCS-2.

In order to confirm the latent structure of the WCS-2 and in order to systematically explore the relationships to conceptually relevant factors, a second study was conducted on an independent sample. The second study attempted a confirmatory factor analysis (CFA) to confirm that the two-factor solution of the first study was valid and reliable and therefore potentially useful in future studies. The CFA requires a set of statistical steps that test consistency with which the EFA works out in a second survey. The question the CFA attempts to answer is: do the factors derived from the EFA match the clustering of items in the second survey?

In addition, a second study was needed to examine whether or not the two factors correlated with other conceptually relevant variables. We selected from a large set of personality and lifestyle variables. We selected variables that have a conceptual relationship to the use of meaningful coincidence, such as overarching personality factors, preference toward intuitive thinking, and affect. These variables, as well as their measurement are described further below.

STUDY 2: CONFIRMATORY FACTOR ANALYSIS AND CORRELATION/REGRESSION ANALYSES

Participants

Participants were 280 undergraduate students at the University of Missouri enrolled in a psychology class. Of the sample, 159 (57%) were female, and 121 (43%) were male. The mean age of the

sample was 19.1 (SD = 1.1). Of the sample, 88.2% were white, 6.8% were black, 2.1% were Asian, less than 1% was Hispanic, and 2.1% reported “Other.”

Measures

The Weird Coincidence Scale-2

Participants were presented with the same prototypical coincidence scenario (see Appendix, page 273) used in the first study to prompt their understanding of “coincidence.” They were then asked to complete a variety of questions regarding the frequency of these experiences — the Interpersonal and Agentic factors. In addition to these two factors identified by the factor analysis, an additional set of items was administered which measured the degree to which individuals believed in coincidences. These items are shown in Sidebar (see page 274) as Analysis and Interpretation items and comprise a separate scale of the WCS indicating beliefs about coincidences as opposed to the frequency of specific types of coincidences. These items represent a first step at understanding the amount in which a person “buys into” coincidences in general as well as their practical use as providing guidance or inspiring spiritual development.

Positive and Negative Affect Scale

The Positive and Negative Affect Scale⁵ measures the independent dimensions of positive and negative affect as part of the formulation for subjective well-being. Participants are presented with nine terms representing positive and negative affect and are asked to rate the degree to which this term represents their feelings presently and generally. The positive affect terms are happy, joyful, pleased, and enjoyment/fun and the negative affect terms are depressed/blue, unhappy, frustrated, angry/hostile, and worried/anxious. Responses vary on a Likert scale from 0 (not at all) to 6 (extremely much). Alpha coefficients were

calculated for both positive and negative affect scales, and they were assessed at .89 and .84, respectively.

Five Factor Inventory

Five Factor Inventory⁶ is a short version of the NEO-PIR which measures several well-known personality dimensions. On the inventory are 12-item measures of Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness.

Referential Thinking Scale

The Referential Thinking Scale⁷ measures ideas of reference, part of a larger construct of schizotypy. Ideas of reference refer to the belief that outside events have a particular and unusual meaning for the person.⁷ The scale is conceptualized to distinguish between normal and pathological forms of referential ideas. There are 34 items on the scale, and responses are in a True/False format. An example of a test item is “When I see two people talking at work, I usually think they are criticizing me.” Results indicated internal consistency reliability of above .8 on multiple instances. Test-retest reliability was assessed at .86. Convergent and discriminant validity tests indicated the scale had associations with other measures of schizotypy while having no relationship with more normative variations of the construct (eg, self-monitoring).

Faith in Intuition Scale

Faith in Intuition Scale (FI)⁸ is part of the Rational-Experiential Inventory. This scale measures the experiential thinking system, which is characterized as being “preconscious, rapid, automatic, holistic, primarily nonverbal, intimately associated with affect,” and has a very long evolutionary history.⁸ The FI scale has an internal consistency reliability of .87 and was established as independent from the Rationality scale. The FI scale had relationships with interpersonal

TABLE 2.

Means and Standard Deviations of WCS-2 Scales

	Mean	SD
Interpersonal	2.66	0.59
Agentic	2.49	0.65
Analysis/Interpretation	2.63	0.75

measures, such as extraversion, trust, and emotional expressivity. The scale contains 20 items on a 7-point Likert scale. An example item is “I tend to use my heart as a guide for my actions.”

Religious Commitment Inventory

Religious Commitment Inventory⁹ measures “the degree to which a person adheres to his or her religious values, beliefs, and practices, and uses them in daily living.”⁹ The scale is composed of 10 items on a 7-point Likert scale. A sample item is, “I spend time trying to grow by understanding my faith.” Coefficient alpha reliability was assessed as between .88 to .96. Test-retest reliability was between .84 and .87.

Vitality Scale

Vitality Scale¹⁰ measures subjective vitality, or positive feelings of energy and aliveness. The scale contains 7 items on a 7-point Likert scale, from 1 (not at all true) to 7 (very true). An example of a test item is “I have energy and spirit.” Alpha values for the scale ranged from .84 to .86. The scale was significantly positively associated with measures of self-actualization and self-esteem, while negatively related to measures of anxiety and depression.

Meaning in Life Scale

Meaning in Life Scale¹¹ measures two independent constructs — presence of meaning in life and search for meaning in life. Responses are varied along a 7-point Likert scale from 1 (Absolutely

TABLE 3.

Confirmatory Factor Analysis Fit Indices

Fit Indices	Value
Chi-square	174.64
NFI	.779
TLI	.748
PNFI	.529
ECVI	.891
AIC	248.64

Untrue) to 7 (Absolutely True). There are 10 questions comprising the scale, with equal representation on Presence of Meaning in Life (5 questions) and Search for Meaning in Life (5 questions). An example of a Search question is “I am looking for something that makes my life feel meaningful”. An example of a Presence question is “I have discovered a satisfying life purpose”. Both scales demonstrated good reliability, with Presence $\alpha = .82$ and Search $\alpha = .87$. Both scales demonstrated good convergent and discriminant validity.

RESULTS

Means and standard deviations of the WCS-2 are reported in Table 2 (see page 275).

Confirmatory Factor Analysis

The latent structure identified in sample 1 was analyzed using results from sample 2. The results from the confirmatory factor analysis using various fit indices are presented in Table 2 (see page 275). The standard value for these indices is 0.9, indicating acceptable fit (readers are encouraged to reference a multivariate analysis text for detailed descriptions). Although these values do not reach the standard value, they approach this value. Investigators are urged to continue to improve upon the scale, as this is viewed as a first effort to scientifically study coincidences.

Reliability

Coefficient alpha values were calculated for each scale of the WCS-2 Interpersonal, Agentic, and Analysis items. For the interpersonal items, $\alpha = .70$, for the Agentic items, $\alpha = .69$, and for the analysis items, $\alpha = .70$. Coefficient alpha measures inter-item reliability, or consistency amongst items. These results indicate modest reliability.¹²

Correlations

Correlations between measures were calculated. As shown in Table 3, significant and positive correlations were found between the Interpersonal items and negative affect, referential thinking, and search for meaning. A significant negative correlation was found between the agreeableness and Interpersonal factor. In addition, positive correlations were significant between Interpersonal items and neuroticism, faith in intuition, and vitality.

Significant positive correlations were found between the Agentic factor and extraversion, negative affect, religious commitment, faith in intuition, referential thinking, and vitality. In addition, positive correlations were found between the Agentic factor and positive affect, and search for and presence of meaning in life. The correlation between the subscales within the Interpersonal and Agentic factors was positive and significant.

In order to determine the relative contribution of conceptually relevant variables to WCS-2 scores, a series of regression equations was calculated, including religious commitment, referential thinking, search for meaning, intuition, negative affect, and vitality as predictor variables. It was predicted that high emotionality (both positive and negative) would correlate with WCS-2 scores because high emotional charge is likely to generate increased associations. It was also expected that a tendency to explore meaning in life

would also be associated with high WCS-2 scores, as this activity is similar to searching for meaning in coincidences. It was hypothesized that WCS-2 scores would also be positively correlated to one’s faith in intuition, self-referential thinking, and religious commitment. Faith in intuition was selected because the process of finding importance in and drawing conclusions from coincidences is generally developed intuitively and rarely through rational means. Referential thinking is characterized by beliefs that “events around me have to do with me.” Looking for coincidences and finding meaning in them represents a form of referential thinking. Religious commitment is often associated with the idea that God intervenes personally in people’s lives, suggesting the coincidences may be interpreted as a means by which people are being guided.

For the model predicting scores on the Interpersonal factor of the WCS-2, six variables accounted for 19.5% of the total variance in interpersonal scores ($F(6, 269) = 10.85, P < .01$). Significant predictors in the model were referential thinking ($\beta = .27, P < .01$), vitality ($\beta = .21, P < .01$), negative affect ($\beta = .18, P < .01$), and search for meaning ($\beta = .14, P < .05$). Faith in intuition ($\beta = .04, P > .05$) and religious commitment ($\beta = .05, P > .05$) were not significant predictors in the model.

For the model predicting Agentic scores, the six variables accounted for 24.3% of the total variance in Agentic scores ($F(6, 269) = 14.4, P < .01$). Of the variables, referential thinking ($\beta = .32, P < .01$), religious commitment ($\beta = .20, P < .01$), vitality ($\beta = .16, P < .01$), and faith in intuition ($\beta = .15, P < .05$) were significant predictors of agentic scores. Search for meaning ($\beta = .08, P > .05$) and negative affect ($\beta = .11, P = .07$) were not significant predictors of Agentic scores.

In addition, a model was constructed to sum Agentic and Interpersonal scores to attain a total WCS-2 score. The same six predictor variables were used. The model accounted for 25.6% of the variance in WCS-2 scores ($F(6, 269) = 15.4, P < .01$). In the model, significant predictors were referential thinking ($\beta = .32, P < .01$), vitality ($\beta = .21, P < .01$), negative affect ($\beta = .17, P < .01$), religious commitment ($\beta = .13, P < .05$), and search for meaning ($\beta = .12, p < .05$). Faith in intuition ($\beta = .10, P > .05$) was not a significant predictor of total WCS-2 scores.

For the model predicting analysis and interpretation items, the model in total accounted for 28.8% of the variance in these scores ($F = 18.1, P < .01$). Of the variables, Religious commitment ($\beta = .38, P < .01$), referential thinking ($\beta = .28, P < .01$), faith in intuition ($\beta = .17, P < .01$), and search for meaning ($\beta = .15, P < .01$) were significant predictors of analysis scores. Negative affect ($\beta = -.05, P > .05$) and vitality ($\beta = .05, P > .05$) were not significant predictors of analysis scores.

DISCUSSION

The purposes of this study were to develop a scale used to measure coincidence experiences. The researchers believed a scale measuring these experiences would contribute to further scientific study of the experiences, leading to a richer and more multidisciplinary knowledge of coincidences.

A secondary aim was to determine possible correlates of high frequency coincidence detection. It was thought that individuals vary in the number of coincidences they report, and those with frequent coincidence experiences would differ in certain personality, lifestyle, and affect measures from those with low or moderate scores on different dimensions of personality and beliefs.

With respect to the first goal, an abbreviated scale (WCS-2) was construct-

TABLE 4.
Correlations among Study Measures

Personality and Well-being	WC Full Scale	Interpersonal	Agentic
FF _n	.10	.14*	.05
FF _e	.14*	.09	.16**
FF _o	.09	.08	.09
FF _a	-.13*	-.18**	-.06
FF _c	.02	.02	.01
PA	.14*	.10	.15*
NA	.21**	.23**	.16**
RC	.17**	.08	.22**
FI	.19**	.12*	.21**
RFT	.38**	.32**	.35**
Vit	.19**	.15*	.18**
Mn ^p	.13*	.09	.14*
Mn ^s	.17**	.19**	.13*

Where FF indicates Five Factor and subscripts indicate each factor (n = neuroticism, e = extraversion, o = openness to experience, and c = conscientiousness). PA indicates Positive Affect, NA indicates Negative Affect, RC indicates Religious Commitment, FI indicates Faith in Intuition, RFT indicates Referential Thinking, Vit indicates Vitality, Mnp indicates presence of meaning, and Mns indicates search for meaning.

*Significant at the .05 level

**Significant at the .01 level

ed from the WCS-1 (reported in the previous study) with two factors measuring interpersonal and agentic types of coincidence experiences. The latent structure was assessed and model fit statistics were modestly close to the acceptable level (see Table 3, page 276). Researchers are encouraged to use these measures with caution and continue to improve in the measurement of self-reported coincidences.

With respect to the second goal, a series of correlations were found between study measures (see Table 4). In particular, several variables demonstrated consistent correlations between both Interpersonal and Agentic items. These included referential thinking, faith in intuition, vitality, negative affect, and search for meaning. These variables appear to be unique in their relationships to both types of coincidence and may comprise a set of core traits of individu-

als who broadly self-report high levels of coincidence experiences. The correlates are explored in more detail as followed in order of the strength of the relationship between it and the factors.

The Interpersonal and Agentic factors were significantly and positively related. This means that the report of these types of coincidences is related, and may also indicate much overlap in the reporting of these types of coincidences.

Of note, one consistently large correlation (across both Interpersonal and Agentic) is referential thinking. This scale measures a type of schizotypy in which an individual believes that events have special individual meaning for them. It would be predicted that the experience of meaningful coincidence and referential thinking would be related, as they both share common features (eg, comparing the internal thoughts to external events). There is also overlap in

item content, such as hearing a song on the radio after thinking of it. For referential thinkers, this song may have been “meant” for them.

Although there was a significant correlation between these two variables, it is important to note that the sample was not a clinical sample. Thus, individuals in the sample likely did not reflect a level of schizotypal thinking characteristic of individuals in a clinical sample.

This relationship has implications for how psychotherapy practice can differentiate between coincidence interpretations that are normal and expected to



those which are pathological and could be potentially harmful to individuals. Therapists are encouraged to note the relationship between referential thinking and coincidence experiences. Based on the relationship, clients who report many meaningful coincidences may also have schizotypal thinking while others may not fit schizotypal diagnostic criteria.

Significant correlations were also found between both the Agentic and Interpersonal factors and faith in intuition. In the regression analysis faith in intuition was a significant predictor only for the Agentic factor. This measure represents an individual’s tendency toward a more experiential and less rational system of processing information. One may expect a relationship between these two measures because they

reveal the extent to which individuals value or dismiss these experiences. It is likely that an individual who relies primarily on rationality may interpret coincidence experiences to be products of random probability while an individual relying on the intuitive system may search for a deeper meaning behind the experience. It is worth noting that referential thinking and faith in intuition are both ways of thinking which impact the reporting of coincidences.

There is also an affective component involved in the reporting of these experiences. Both negative affect and vitality were associated with both the Agentic and Interpersonal factors. These scales measure different types of

factor. Individuals who are consistently searching for meaning may incorporate broader sources of information from which to derive meaning. This array may also include coincidence experiences as a means of finding meaning in life. However, when it comes to using the experiences to make important life decisions (eg, in the case of Agentic items), people who have an already existing meaning structure may feel confident enough to use the experiences in a way that is more impactful to their lives.

The correlations between study measures also differed between the WCS-2 items and the analysis/interpretation items. These differences may reflect a difference in item content.

These latter findings suggest that religiously committed people believe that their coincidences provide divine guidance for work and school but not for strengthening interpersonal connectedness.

affect, with negative affect measuring anxiety and negative arousal constructs and vitality measuring energy, aliveness, and positive arousal. Our view on these constructs is that high levels of affect — whether positive or negative — will drive the search for meaning from these experiences. Following negative life events such as sickness, job loss, financial problems, and grief, individuals tend to look for signals to guide them and provide understanding. In a similar way, in highly positive emotional states, individuals also search for meaning from life events, including guidance about and confirmation of life decisions.

The final consistent predictor of high scores on the Agentic and Interpersonal factors was “search for meaning.” Although search for and presence of meaning in life are considered independent constructs, there were associations between both measures and the Agentic

Although the Interpersonal and Agentic factors measured self-reported frequencies of coincidences, the analysis/interpretation items measured beliefs about these coincidences. They are not contingent upon each other. Thus, an individual who is religiously committed may believe these coincidences to be divine messages, but still not experience them in high frequencies. This appeared to be the case given the high correlation between religious commitment and the analysis/interpretation items. Although there was a nonsignificant correlation between religious commitment and the interpersonal factor, there was a significant correlation with the Agentic factor. These latter findings suggest that religiously committed people believe that their coincidences provide divine guidance for work and school but not for strengthening interpersonal connectedness.

FUTURE CONSIDERATIONS

In the future, researchers should also investigate the links between the frequency of coincidences and specific life cycle experiences including birth, dying, illness, and marriage as well as other individual psychological differences. For instance, the link between coincidences and other affective experiences, such as depression, anxiety, mania and psychosis could be explored. The relationship between other clinically-oriented personality variables like narcissism and borderline personality disorder could also be explored. The potential for researching the association between coincidences and spirituality has been initially explored with high correlations demonstrated in the WCS-1, but many open questions remain. For example, do spiritual people seek out coincidences or do dramatic meaningful coincidences instill spiritual yearnings? What are the characteristics of people who regularly guide their lives by coincidence?

One limitation in our study is the restricted samples. The first sample may have over-represented individuals who tend to report high levels of coincidence, because these individuals responded to an advertisement to participate in the study. However, these individuals were also more varied with respect to age. The second sample did not have the same bias since they were not self-selected. However this sample included only undergraduate students and therefore represented a restricted age range. It may be the case that age played a role in an individual's ability to recognize and utilize coincidences in this younger group. For instance, the developmental trend toward a type

of referential thinking (eg, the adolescent thought that "everyone is talking about me") may impact the reporting of coincidences. On the other hand, older individuals may tend toward recognizing coincidences as part of a growing search for meaning in their lives. A more representative sample is advantageous in that it samples equally from a wider range of demographics as well as associated characteristics, giving a more general sense of the experience of coincidences. However, the frequencies reported for all items in both WCS-1 and WCS-2 showed very little variance, suggesting the selection bias played little role in the outcomes.

Another limitation is the scale itself. Replication studies should be conducted to determine whether sampling impacted the model fit statistics. For instance, it is imperative to ensure that the scale be evaluated using a comparable sample to the intended audience of the scale (eg, undergraduates, academic communities, religious leaders, specific religious groups, psychotherapists, psychiatrists, or the public). As more theoretical attention is paid to coincidences, more accurate measures can be developed since theory and its measures reciprocally impact each other. These studies represent a first effort at systematically measuring coincidences.

Our results represent an important first step in understanding meaningful coincidences. Although they leave a variety of open questions with respect to coincidences, our results indicate some relationship between both cognitive and affective individual difference variables and the reporting of coincidences. We also provide a tool by which to measure the reporting

of coincidences. We hope that both the tool and our initial findings will prompt a greater discussion of coincidences, both within the general scientific literature and within psychiatric practice.

REFERENCES

1. Jung CG. *Synchronicity: An Acausal Connecting Principle*. Princeton, NJ: Princeton University Press; 1973.
2. Clark MW. Synchronicity and post-structuralism. Quebec University. Doctoral dissertation; 1996. Retrieved from <http://web.ncf.ca/dy656/earthpages3/cv.htm>.
3. Falk R. Judgment of coincidences: Mine versus yours. *American Journal of Psychology*. 1989; 102:477-493.
4. Meyer MB. Role of personality and cognitive variables in the reporting of experienced meaningful coincidences or "synchronicity." San Francisco, CA: Saybrook Institute. Unpublished doctoral dissertation; 1989.
5. Diener E, Emmons RA. The independence of positive and negative affect. *J Pers Soc Psychol*. 1984;47(5):1105-1117.
6. Costa PT, Jr, McCrae RR. *NEO PI-R Professional Manual*. Odessa, FL: Psychological Assessment Resources, Inc.; 1992.
7. Lenzenweger MF, Bennett ME, Lilienfeld LR. The referential thinking scale as a measure of schizotypy: Scale development and initial construct validation. *Psychological Assessment*. 1997;9(4):452-463.
8. Pacini R, Epstein S. The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *J Pers Soc Psychol*. 1999;76(6):972-987.
9. Worthington EL, Wade NG, Hight TL, et al. The Religious Commitment Inventory-10: Development, refinement, and validation of a brief scale for research and counseling. *Journal of Counseling Psychology*. 2003;50(1):84-96.
10. Ryan RM, Frederick C. On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *J Pers*. 1997;65(3):529-565.
11. Steger MF, Frazier P, Oishi S, Kaler M. The Meaning in Life Questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*. 2006; 53(1):80-93.
12. Nunnally J, Bernstein I. *Psychometric Theory*. New York: McGraw Hill; 1994.