

# What-If Analysis: Antecedents and Consequences Factors of Counterfactual Thinking

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## **Abstract**

*The present study shows the relationship between counterfactual thinking and resilience, optimism, sense of coherence, hardiness, benign and malicious envy, rational and intuitive decision making, rumination. The sample for the study was 200 young adults (18-35 years). The assessment scales used for the present study were The Brief Resilience Scale (BRS), Sense of Coherence Scale (SoC), A Short Hardiness scale, The Benign and Malicious envy scale (BeMaS), Rumination Revised Scale (RSS), Decision Making Questionnaire (DMQ), Counterfactual Thought for Negative Events Scale (CTNES) and Life-Orientation Revised Scale (LOT-R). Correlation and regression analysis was done using SPSS(20.0) software. The findings of the study showed a significant inverse correlation between counterfactual thinking and optimism whereas a significant direct correlation was observed between counterfactual thinking and resilience, sense of coherence, hardiness, benign and malicious envy, rational and intuitive decision making and rumination. It was also found that rational and intuitive decision making and rumination were the best predictor of counterfactual thoughts respectively.*

**Keyword:** *Counterfactual Thinking, Resilience, Optimism, Sense Of Coherence, Hardiness, Benign And Malicious Envy, Rational And Intuitive Decision Making and Rumination.*

## **Introduction:**

Counterfactual thinking is thinking about a past that did not happen. This often happens in 'if only...' situations, where we wish something had or had not happened. It can also be explained in other terms that it focuses on how the past might have been, or the present could be, different.

By definition, "counterfactual thinking is a concept in psychology that compromises individual's tendency to generate possible alternatives to life events which are opposing to what have happened in the past. It fundamentally means 'counter to the facts'" (Roese, 1997, p. 48).

## Types of Counterfactual Thinking:

Significantly, counterfactuals are mostly evaluative, postulating alternatives that are either better or worse than the reality. Better alternatives are classified as upward counterfactuals whereas worse alternatives are classified as downward counterfactuals (Markman, et al., 1993, p. 87-109).

### Upward Counterfactuals:

Upward counterfactuals are those set of thoughts that focus on how the end result of the situation could have been better than the reality. By definition, upward counterfactuals are the mental stimulation of better possible outcomes of the current situation. For example, “had I started preparing for my exams earlier I would have scored better grades”. Upward counterfactual thoughts tend to make people feel worse and unsatisfied with the outcome.

### Downward Counterfactuals:

Downward counterfactuals are set of thoughts that focus on how the end result of the situation could have been worse than the reality. By definition, downward counterfactuals are the mental stimulation of worse possible outcomes of the current situation. For example, “I am fortunate enough to get a B grade on my test result, I didn’t start studying until last night”. Downward counterfactual thoughts make the individual feel happier and satisfied with the outcome, even when the end results are negative since they think about how the outcome could be worse than the reality.

## Functional theory of Counterfactual Thinking:

Functional theory of counterfactual proposed by Epstude & Roese (2008) focus on how counterfactual thoughts and their respective cognitive processes benefit the individual. Counterfactual thoughts aid a preparative function benefiting individuals to dodge blunders of the past. Counterfactual thoughts also effect emotional functions by helping the individual to feel better about the past scenario. By associating the present result with a more desirable result, the individual tends to feel better about the present scenario.

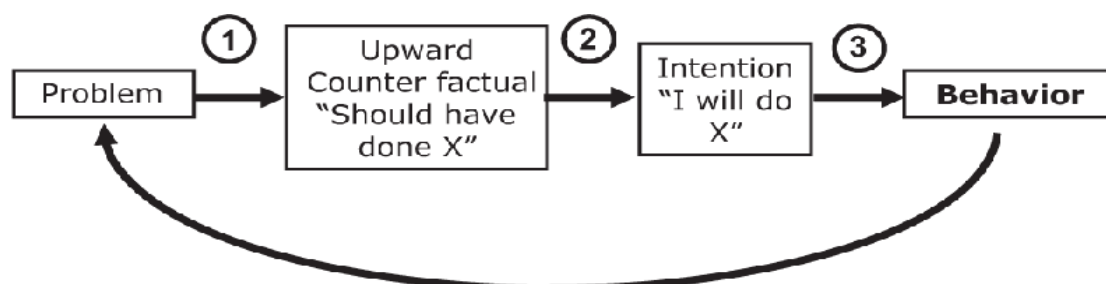


Figure 1: The content specific pathway by which counterfactual affects behaviour

(SOURCE: Adapted from Roese & Olson, 1997)

## **Variables related to Counterfactual Thinking:**

### **Resilience:**

Resilience is the phenomena which serves and help individuals during hard times like stress, family issues, and pressure from work, trauma, etc., as they affect an individual in many terms so it helps to cope better with these situations. It is defined as the “incidence of factors that are protective such as personal, social, familial, and institutional safety nets which enable the individual to defy life stress” (Kaplan et al., 1996).

Resilience can link to many other factors and one of the variable is counterfactual thinking. This same was explained from the study done by Alexander & Elizabeth (2016) in which they did study on fire fighters as fire fighters respond to a wide variety of critical incidents so resilience as a coping strategies plays an important in these situations.

### **Sense of coherence:**

According to Antonovsky’s definition (Antonovsky 1987) SOC is:

“a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that 1) the stimuli, deriving from ones internal and external environment in the course of living are structured, predictable and explicable; 2) the resources are available for one to meet the demands posed by these stimuli; 3) these demands are challenges, worthy of investment and engagement”.

“SOC thus has three main components: comprehensibility, manageability and meaningfulness” (Antonovsky 1979, Antonovsky 1987).

Sense of Coherence is also related to counterfactual thinking which further explained that how counterfactual thoughts contribute to the outlook of the negative situations faced by individuals. Results of one study explains that among personality characteristics related to proactive coping and counterfactual thinking, they focuses on anxiety. The results shows a higher level of proactive and preventive coping, as well as higher SOC and GSES, related to positive opinion of the helpfulness of counterfactual thinking in solving possible future problems and to lower anxiety (Zdena & Alexandra, 2010).

### **Hardiness:**

Hardiness can be defined as the personality trait of an individual actually seem to thrive on stress instead of letting the stress wear them down. Such persons are called hardy personality, a term first coined by Kobasa (1979). It can be said that the higher level of hardiness will reduce the negative effects of stressful events which can also explained by different researches carried by Kobasa (1979; 1982a; 1982b; 1984). Kobasa, et. al., (1982) explored the concept of “Personality Hardiness” as a resistance resource that mediates the negative consequences of high level stress.

### **Decision making:**

The term “decision making” has been defined as a process of judging various available options and narrowing down choices to a situation one. “Decision making is a process of recognising

and selecting a possible different course of action demanded by the situation. (Kreitner, 1966). There are two main style of decision making described below: *Rational Decision Making*: Individuals who adopt rational decision making style anticipate the need for decision making and gathers necessary information about themselves and their environment. *Intuitive Decision Making*: Intuitive decision making is “a subconscious process created out of a person’s experiences” (Robbins & Judge, 2012). Irrespective of the availability of limited information, an intuitive decision maker can make quick decisions. Soukhanov (1999) defined that “intuition is known as something instinctively without having to discover or perceive it”.

### **Envy:**

“Envy is defined as a negative emotional response to another person’s superior quality, achievement, or possession, in which the envier either desires the advantage or wishes that the envied person lacks it.” (Parrott & Smith 1993: 906).

Psychologists explained two types of envy: Malicious and Benign Envy. Malicious envy can be defined as a sick force which enforces the person to ruin others in different terms but on the other side Benign envy can be defined as a motivational factor and can be said a positive force through which an individual can thrive to be better day by day.

### **Rumination:**

Rumination is a type of extended thinking, the nature, causes, and consequences of which have been widely evaluated. Rumination is a form of preservative cognition that focuses on negative content, generally past and present, and results in emotional distress.

Mark & Katie (2009) did a study which focuses on four types of cognitions which were appraisal, attribution, counterfactual thinking, and rumination. This study was done on athletes to find out that athletes may exhibit in the immediate aftermath of a competitive defeat. The results of the research showed that how athletes show defeat after having these cognitions in mind while having their tournament on.

Another research was done by Sanna et. al. (2003) in which they explained how rumination will effect by the spectres of past and future in the present (counterfactual thoughts). The results of the study suggested that the behaviours will be repetitive or recurrent in nature once the counterfactual thought has been generated which will have an effect on rumination nature of an individual.

### **Optimism:**

“Optimism defined and conceptualized in different ways, in general is related to positive mood and good morale, Lionel Tiger (cited by Peterson, 2000, p.44) offered a useful explanation of optimism, it is a mood or attitude associated with an explanation about the social or material and desirable future. Recent approach explains optimism as a goal or expectation”.

Four studies investigated the prefactual (alternative pre outcome predictions) and counterfactual (alternative postoutcome "what might have been") mental simulations of defensive pessimists and optimists. In Study 1, defensive pessimists engaged in upward (better

than expected) prefactual thinking, whereas optimists engaged in downward (worse than actuality) counterfactual thinking in reaction to a course exam. In Study 2, defensive pessimists preferred upward prefactual thinking and optimists preferred no prefactual thinking when prefactual thoughts were directly manipulated. In Studies 3 and 4, defensive pessimists and optimists differed in reactions to manipulated success and failure, and these reactions were further moderated by the opportunity to engage in prefactual thinking and the possibility of a second try (Sanna, 1996).

### **Methodology:**

#### **Participants:**

The sample of the present study includes 200 participants (males and females) residing in Delhi, NCR. Participants were randomly selected ranged in the age from 18-35 years including both working and non-working individuals. All of them belong to high socio-economic strata. There were no signs of psychological disorders.

#### **Measures:**

##### The Brief Resilience Scale (BRS):

The Brief Resilience Scale was developed by Smith et. al. (2008) purely to assess the concept of resilience under its original etymology or measure of ability. The Brief-Resilience Scale intends to measure one's ability to bounce back or recover from stress. The Brief Resilience Scale is a 6-item scale and Scoring is measured on a 5-point scale, adding the responses on all six questions with possible ranges from 6-30. Scores range from: Strongly disagree to strongly agree.

The internal consistency of the BRS was good, calculated with four different samples. The results came with Cronbach's alpha ranging from .80–.91. The BRS was given twice in two samples with a test-retest reliability (ICC) of .69 for one month. The validity of the scale was described by calculating convergent and discriminant predictive validity with scores ranging from 0.70 to 0.85.

##### Sense of Coherence Scale (SoC):

A shorter version of 13 questions of the original form was developed by Antonovsky, where the score ranges between 13 and 91 points and items were answered on a 7-point likert scale. The scale comprises three components: comprehensibility (to which 5 items contribute), manageability (4 items), and meaningfulness (4 items). SOC questionnaires from a sample of 623 healthy adults were analysed using Rasch analysis.

The item and person reliability coefficients were 0.99 and 0.81, respectively, for the 7-category scale and 0.99 and 0.82 for the 5-category scale. The face validity of these scales was assessed and explained that the sense of coherence scales have been empirically tested in different cultures, both Western and cultures in Africa and Asia.

### A short hardiness scale:

This scale was developed by Bartone & Paul in 1995. A short, 15-item hardiness measure (DRS-15) was derived from a longer (30-item) version and has shown good internal consistency ( $\alpha = .22$ ) and criterion-related validity across multiple samples (Bartone, 1995, 1999). Scores on the DRS-15 version correlate .84 with the 30-item version ( $N = 1193$  Army males).

Corresponding test-retest coefficients for the three hardiness subscales, with five items each, were Commitment = .75, Control = .58, and Challenge = .81. This scale was demonstrated appropriately criterion-related validity and predictive validity in several samples, with respect to both health and performance under high-stress conditions.

### The Benign and Malicious envy scale (BeMaS):

This scale was developed by Lange & Crusius in 2015. The BeMaS is a measure which examines two subtypes of envy, namely benign envy and malicious envy. The BeMaS consists of ten items which require the participants to rate their envious feeling on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The higher average score indicates more envious feelings.

To assess the reliability and validity of this scale, two samples of university students were recruited for this purpose ( $N_1 = 500$ ;  $N_2 = 356$ ). Both subtypes of envy significantly correlated with other psychological (depression, anxiety, and stress) and behavioral problems (conspicuous consumption orientation), evidencing the construct validity of BeMaS. Benign envy scale and malicious envy scale demonstrated good internal consistency in both samples. This measure was originally tested by Lange and Crusius (2015) in four studies ( $N_1 = 365$ ,  $N_2 = 194$ ,  $N_3 = 192$ ,  $N_4 = 474$ ), providing some supports for its psychometric properties. The reliability coefficients for the measure came out in the range from 0.77 to 0.89 which reports the high consistency of the scale. The validity of the test was also good.

### Decision Making Questionnaire (DMQ):

The Decision Making Questionnaire was developed by Antonio et. al. in 2009. The 'Decision-Making Questionnaire' (DMQ) was developed and validated in order to examine the factors that affect decision making. The reliability of this test was measured by test-retest reliability and came out to be high for both rational ( $r = 0.79$ ,  $p < .01$ ) and intuitive ( $r = 0.79$ ,  $p < .01$ ) dimensions. The discriminant and convergent validity across the DSS rational and intuitive styles. As expected, age, gender, and cognitive ability were not significantly related to either DSS sub-scale. GPA had a small to moderate positive correlation with DSS rational style.

### Rumination revised scale (RRS):

A short version of the Ruminative Response Scale (RRS) formed by (Treyner et al (2003), consists 10 items from the original list of 22 which was developed by Nolen-Hoeksema and

Morrow (1991). The scale was obtained by selecting the items that had the highest item-total correlations with the total score. The short version is highly correlated to the full version of the scale ( $r = .90$ ) and has a high level of internal reliability (Cronbach's  $\alpha = .85$ ). Each item is scored on a 4-point Likert scale, ranging from 1 ("almost never") to 4 ("almost always"). The inter-item reliability of the Reflection subscale was  $.72$  and the test-retest correlation was  $r = .60$ . For the Brooding subscale, coefficient alpha was  $.77$  and the test-retest correlation was  $r = .62$  (Treyner et al., 2003).

#### Counterfactual Thought for Negative Events Scale (CTNES):

This scale was developed by Rye et. al. in 2008. To assess the psychometric properties of the newly created Counterfactual Thinking for Negative Events Scale (CTNES) was done in two studies involving university undergraduates done by Mark et. al., 2008. In Study 1 ( $N = 634$ ), factor analysis revealed four subscales that correspond with various types of counterfactual thinking: Nonreferent Downward, Other-Referent Upward, Self-Referent Upward, and Nonreferent Upward. The subscales were largely orthogonal and had adequate internal consistency and test-retest reliability ranging from  $0.75$  to  $0.89$ . The CTNES subscales were positively correlated with a traditional method of assessing counterfactual thinking and were related as expected to contextual aspects of the negative event, negative affect, and cognitive style. In Study 2 ( $N = 208$ ), it further examined the validity of the scale and demonstrated that the subscales were sensitive to an experimental manipulation concerning the type of negative event participants recalled.

#### Life Orientation Test-Revised (LOT-R):

Revised Life Orientation Test (LOT-R) Developed by psychologist Michael Scheier and colleagues (1994), the Revised Life Orientation Test (LOT-R) is a 10-item scale that measures how optimistic or pessimistic people feel about the future.

The positively worded three-item optimism subscale of the LOT-R was examined separately and fit the data, with factor loadings equivalent across language-preference groups. Coefficient alphas for the optimism subscale were consistent across both language-preference groups ( $\alpha = .61$  [English] and  $.66$  [Spanish]). In contrast, the six-item total score and three-item pessimism subscale demonstrated extremely low or inconsistent alphas. Convergent and divergent validity were established for the optimism subscale in both languages and was highly validated.

#### Procedure:

All the individuals were given a pile of questionnaires which were: The Brief Resilience Scale; Life Orientation Test-Revised; Sense of Coherence Scale; A Short Hardiness Scale; The Benign and Malicious Envy Scale; Decision Making Questionnaire and Rumination Revised Scale. It took 15 to 20 minutes to complete the questionnaires. The scoring was done as per the guidelines given in their manuals. Inferential Statistics, that is, correlations were used to examine the relationship between counterfactual thinking and taken variables (Resilience,

Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making and Rumination) in the overall population and regression was used to study whether these variables were the predictors of counterfactual thinking or not. SPSS (17.0) was used for the statistical analysis of the data.

### Results:

Table 1: Correlation co-efficients (r) between Counterfactual Thinking and Resilience, Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making and Rumination.

Variables	Counterfactual Thinking
Resilience	.32**
Optimism	-.14*
Sense of Coherence	.45**
Hardiness	.22**
Benign Envy	.26**
Malicious Envy	.18*
Rational Decision	.38**
Intuitive Decision	.29**
Rumination	.61**

\*p<0.05 (two tailed)

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Table 1 reports a significant correlations between all the variables taken in the study (Resilience, Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making, and Rumination) and Counterfactual Thinking. An inverse relation was found with only one variable which was Optimism ( $r = -.14$ ). A direct positive relation was found between counterfactual thinking and rest of the variables and the correlation co-efficients came out for Resilience ( $r = .32$ ), Sense of Coherence ( $r = .45$ ), Hardiness ( $r = .22$ ), Benign ( $r = .26$ ) and Malicious ( $r = .18$ ) Envy, Rational ( $r = .39$ ) and Intuitive ( $r = .29$ ) Decision Making and Rumination ( $r = .61$ ).

Table 2: Linear regression (step wise) predicting Counterfactual Thinking, Resilience, Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making and Rumination.



Variables	B	$\beta$	t	R <sup>2</sup>	F - ratio
Resilience	32.60	.32	4.83	.110*	23.30
Optimism	40.10	-.20	-2.12	.140*	16.36
Sense of Coherence	27.65	.36	5.50	.260*	22.48
Hardiness	24.28	.18	2.77	.280*	19.36
Benign Envy	23.56	.11	1.72	.300	16.24
Malicious Envy	23.18	.03	0.46	.300	13.50
Rational Decision	15.32	.31	4.77	.370*	16.13
Intuitive Decision	11.93	.15	2.48	.400*	15.22
Rumination	1.99	.46	7.49	.530*	23.71

\*p<0.05 (two tailed)

A linear regression predicting Resilience, Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making, and Rumination and Counterfactual Thinking was carried out. The value of regression .ie., the sum of R<sup>2</sup> for Resilience, Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making, and Rumination lies at .110, .140, .260, .280, .300, .300, .370, .400 and .530 respectively as shown in Table 2.

### Discussion:

The study aimed at exploring the relationship between Counterfactual Thinking and Resilience, Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making, Rumination. Correlation and regression was used to assess the relationship. An inverse relation was found with optimism indicating that whenever a counterfactual thought generates, optimism will decrease. Michael & Beatriz (2015) suggested that optimism and pessimism are cognitive expectancies regarding future events, whereas counterfactual thinking is the cognitive process of imagining alternatives to events that occurred in the past. After controlling the effects of positive and negative affect, it was found that downward counterfactual thinking (imagining how things could have been worse) was associated with optimism. Another study investigated the pre-factual (alternative pre outcome predictions) and counterfactual (alternative post outcome "what might have been") mental simulations of defensive pessimists and optimists (Sanna, 1996). It explained the same results for optimism. The findings of the study suggested that optimists engaged in downward (worse than actuality)

counterfactual thinking and optimists preferred no prefactual thinking when prefactual thoughts were directly manipulated.

A direct relationship was also found between counterfactual thinking and Resilience, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making, and Rumination. It can be concluded that the production of counterfactual thoughts may generate envy in an individual in the terms in which individuals were rated to imply others' good luck and own bad luck, which could easily have been interchanged (Karl Havlor, 2008).

It can also be explained that when a person made counterfactual thought about an event that happened in the past, then he/she may try to find the alternatives to that particular situation so that they could take better decision next time. It can also be stated that whenever counterfactual thoughts are generated, individual will be able to take better decisions. This relationship has been proved by Neal Roese (1999) which suggests that counterfactuals may cause decision makers to become liberally biased (i.e., capricious) in terms of tactics, but conservatively biased (i.e., rigid) in terms of long-term strategy. Laura & Adam (2003) suggested that counterfactual prime condition was more likely to make the correct decision as compared to groups in the non-counterfactual prime condition and the effect of counterfactual primes on decision accuracy. They also explained that the counterfactual prime condition was more likely to seek dis-confirmatory information than groups in the non-counterfactual prime condition.

The present study also established a direct relationship between counterfactual thinking and sense of coherence which concluded that there will be increased sense of coherence whenever the counterfactual thoughts have been generated. David Soble (2004) notes that overall, children are better at generating explanations regarding why events are impossible than recognizing that no alternative could be generated for impossible events.

As discussed above that counterfactual are of two types (upward and downward). Upward counterfactuals are those set of thoughts that focus on how the end result of the situation could have been better than the reality whereas downward counterfactuals are set of thoughts that focus on how the end result of the situation could have been worse than the reality. To explain the relationship between rumination and counterfactual thinking, several researches have been done which explain how counterfactuals can influence the nature of rumination. In a study of social anxiety, Kocovski, Endler, Rector, and Flett (2005) showed that compared with a control group, people with social phobia showed an increased amount of ruminative coping after exposure to fictitious social situations. Participants high in social anxiety were more likely to report upward counterfactual thoughts than were low-social-anxiety participants. Participants with social anxiety seem to be highly concerned about potential past failures and inadequate behavior in social situations (Rachman, Gruter-Andrew, & Shafran, 2000), resulting in both greater rumination and greater upward counterfactual thinking. Also, some dysfunctional counterfactuals become the fodder for rumination, as when a car accident victim focuses relentlessly on how she might have avoided the accident, even though to an outside observer, the accident was attributable entirely to the other driver, who was drunk at the time (cf. Davis, Lehman, Wortman, Silver, & Thompson, 1995).

Regression analysis between Counterfactual thinking and the variables- Resilience, Optimism, Sense of Coherence, Hardiness, Benign and Malicious Envy, Rational and Intuitive Decision Making, and Rumination were assessed to understand how well these variables can predict counterfactual thoughts or vice versa. The results of the regression analysis showed that Rational and Intuitive decision making and Rumination variables were the best predictor of counterfactual thoughts.

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