The effect of forecasting on individuals' implicit creative idea evaluation process

Lotte Bruijninckx

2013934

Master's thesis

Communication and Information Sciences

Specialization New Media Design

School of Humanities and Digital Sciences

Tilburg University, Tilburg

Supervisor: A. de Rooij

Second reader: K. Slegers

June 2019

Abstract

Prior research suggested that extensive forecasting during idea evaluation may play a critical role in reducing evaluators' feelings of uncertainty. These feelings of uncertainty cause an implicit bias against originality which hinders people to appreciate highly inventive ideas, and makes them focus more on safe and practical options. The current research was carried out to investigate whether extensive forecasting could be seen as an uncertainty reduction strategy in order to improve individuals' evaluations of an idea's originality. In the present study, 80 undergraduates were asked about their level of intolerance for uncertainty, implicit and explicit associations towards originality and practicality, forecasting and evaluation skills, and feelings of uncertainty during idea evaluation. No evidence was found for the expectation that extensive forecasting was related to one's implicit associations towards originality. Subsequently, no significant effect of one's implicit associations towards originality on idea evaluation was found. However, extensive forecasting seemed to directly reduce evaluators' feelings of uncertainty, which consequently influenced idea evaluation (i.e., originality and practicality). Future research is needed to get a deeper understanding of the exact role of these feelings of uncertainty between extensive forecasting and idea evaluation.

1. Introduction

'Better safe than sorry'. Nowadays, highly original ideas are not easily accepted, especially when there are more practical and unoriginal options available. People tend to select ideas they believe in. However, big improvements and innovative solutions often require novelty. Until now, research mainly focused on understanding and developing techniques related to enhancing idea generation (e.g., Baas, De Dreu, & Nijstad, 2008; Shalley & Gilson, 2004). After all, to successfully implement creative ideas into practice, the best idea resulting from idea generation should be recognized and selected (Zhu, Ritter, & Dijksterhuis, 2019). Hence, an extended understanding of idea generation is not enough to end up with a strong creative solution to an ill-defined problem. Although more attention has been directed to late cycle processes, such as idea evaluation and idea selection (e.g., Byrne, Shipman, & Mumford; 2010; Mumford, 2001), less is known about these late processes as compared to earlier processes (e.g., idea generation) as part of the creative process. Therefore, this study tries to expand the research field of late creative cycle processes by investigating general people's implicit evaluation process regarding ideas' originality and practicality.

The increasing amount of research on idea evaluation (e.g., Byrne et al., 2010; Mumford, 2001) showed that this phase is of considerable importance in creative thought (Hunter, Friedrich, Bedell, & Mumford, 2006). During idea evaluation, potential solutions' consequences and possible outcomes for idea implementation are considered, and are assessed with respect to a certain set of standards related to the setting at hand (Watts, Mulhearn, Todd, & Mumford, 2017). There is consensus that an idea is creative when it includes both originality and practicality (Amabile, 1983; Mumford & Gustafson, 1988; Rietzschel, Nijstad, & Stroebe, 2010; Runco & Charles, 1993). Therefore, these two criteria are frequently used as a set of standards during creative idea evaluation. However, research showed that most individuals face difficulties with valuing both criteria simultaneously, because of their strong preference for practicality over originality (Manske & David, 1968; Reiter-Palmon, Kennel, & Kaufman, 2018). This preference makes their evaluations of creative ideas to some extent biased. Although people explicitly state that they are searching for originality, they often have an implicit bias against it (Mueller, Melwani, & Goncalo, 2012).

An explanation for this implicit bias against originality relative to practicality is the perception of uncertainty. Higher levels of originality cause more uncertainty about an idea's practicality (Amabile, 1996), and are associated with perceptions of risk (Dailey & Mumford, 2007; Rubenson & Runco, 1995). In addition, people have an ingrained desire to maintain a sense of certainty, and preserve the familiar (Toh & Miller, 2016). Therefore, higher levels of uncertainty hindered people to appreciate novelty, and made them focus more on the practical aspect in the evaluation process (Mueller, Melwani, & Goncalo, 2012). This effect seemed especially true for individuals with a lack of confidence and certainty in the context of insufficient information, and therefore experience difficulties with adapting to this uncertain information (i.e., intolerance for uncertainty; O'neill et al., 2006). Combining these observations, neutral idea evaluation requires a strategy that mitigates the implicit bias against originality by reducing the perception of uncertainty. Mueller et al. (2012) suggested a follow-up study to identify factors that could weaken the implicit bias against originality. To our knowledge, no research has examined these influencing factors. Examining variables (e.g., reducing uncertainty) that could mitigate one's implicit bias against originality relative to practicality could make a contribution to the scientific knowledge about this topic.

Given that uncertainty in this context is a lack of knowledge, the most straightforward approach is to increase knowledge about the situation, its influences and possible outcomes (i.e., information seeking), which is supported by the uncertainty reduction theory (Kramer, 1999; Kreye, 2016; Kuhlthau, 1993). One information seeking strategy that shares characteristics with an uncertainty reduction strategy is forecasting. Forecasting is a psychological process in which potential ideas' influences and imaginable outcomes are considered. More extensive forecasts were found to help evaluators better appraise and revise ideas, which eventually led to an improved final solution's originality, quality, and elegance (Byrne, Shipman, & Mumford, 2010). Following these lines, forecasting could be seen as an uncertainty reduction strategy, which could mitigate individuals' implicit bias against originality relative to practicality. As a consequence, evaluators should be more open to originality, and as a result, evaluate an idea's originality more positively.

These observations led to the following research question:

To what extent could forecasting during idea evaluation be seen as an uncertainty reduction strategy to lower individuals' implicit bias against originality relative to practicality in order to improve their evaluation of ideas' originality?

2. Theoretical framework

2.1 Creative thought

Mumford, Mobley, Reiter-Palmon, Uhlman and Doares (1991) proposed the creative process model (Figure 1) including the eight underlying cognitive processes when producing creative problem solutions. According to this model, creators start with constructing or defining problems, which serves as a foundation for the following phase in which information is gathered about the problem. Consequently, this collected information is used to combine and restructure this information to create new concepts and understandings. These cognitive processes (i.e., problem definition, information gathering, concept/case selection, conceptual combination, and idea generation) are early cycle processes. However, ideas flowing from these processes are of no value when the good ones are not selected, implemented well, or monitored in the right way. These cognitive activities (i.e., idea evaluation, implementation planning, and adaptive execution) are considered as late cycle processes.

Although most research on creative problem solving has focused on early cycle processes (Mumford, 2001), recently more attention has been directed to late cycle processes, among which idea evaluation (e.g., Blair & Mumford, 2007; Byrne, Shipman, & Mumford, 2010; Mumford, 2001). Consequently, idea evaluation was found to be a core process as part of creative thought (Hunter, Friedrich, Bedell, & Mumford, 2006; Mumford, 2001, Mumford et al., 1991). However, until now, little research examined idea evaluation as compared to the other processes in the creative process model. Therefore, this study tries to expand the research on idea evaluation to get a deeper understanding of this process.

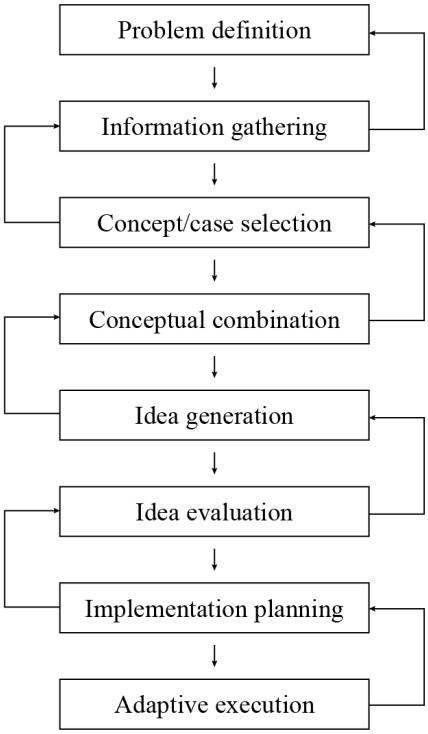


Figure 1. Creative process model as proposed by Mumford, Mobley, Reiter-Palmon, Uhlman, and Doares (1991)

2.2 Bias in idea evaluation

During idea evaluation, possible consequences and outcomes for idea implementation are assessed with respect to a certain set of standards appropriate to the circumstances (Byrne, Shipman, & Mumford, 2010; Watts, Mulhearn, Todd, & Mumford, 2017). The best idea has to be recognized, and selected from the collection of generated ideas. As mentioned in the introduction, creative ideas require both originality and practicality (Amabile, 1983; Mumford & Gustafson, 1988; Rietzschel, Nijstad, & Stroebe, 2010; Runco & Charles, 1993). Originality is the key determinant of creativity beyond ideas, whilst practicality distinguishes creative behavior from acting that is merely bizarre (Rietzschel, Nijstad, & Stroebe, 2010). These two aspects of creativity (i.e., originality and practicality) are frequently used as standards during the evaluation of creative ideas. Runco, Okuda, and Thurstone (1987) concluded that people tend to first appraise ideas on practicality, and then on originality, since the evaluation of practicality helps to identify original ideas. Based on the evaluation

of these two aspects, evaluators decide whether a creative idea is qualified to be implemented, should be revised, or has to be dropped (Byrne et al., 2010).

The standards for the evaluation of creative ideas (i.e., originality and practicality) suggest that they are two principles that go hand in hand. However, research showed that evaluators are having a hard time valuing both aspects simultaneously. When an idea is evaluated as practical, it is often considered as unoriginal, and vice versa (Benedek et al., 2016; Manske & Davis, 1968; Nijstad, De Dreu, Rietzschel, & Baas, 2010; Rietzschel et al., 2010). Individuals aim their attention to either one of the two, at the expense of the other (Nijstad et al., 2010). This reversed interplay could partly be explained by individuals' negative associations toward originality. Even though people explicitly say that they value originality, they have an implicit aversion to it (Mueller, Melwani, & Goncalo, 2012). As a result, people have a strong inherent preference for practicality (Reiter-Palmon, Kennel, & Kaufman, 2018), which makes their evaluations of creative ideas to some extent implicitly biased.

2.3 The role of uncertainty in bias

Negative associations toward originality causing implicit evaluation bias are provoked by the perception of uncertainty (Bower, 1981). Higher levels of novelty induce more uncertainty about whether an idea is practical (Amabile, 1996). Additionally, focusing on ideas' novelty may lead to perceptions of risk (Dailey & Mumford, 2007; Rubenson & Runco, 1995). These perceptions of risk are controlled by feelings of irresponsibility to adopt novel ideas, and social responsibility to meet set communal norms (Dailey & Mumford, 2007). People have an ingrained desire to maintain a sense of certainty, and preserve the familiar (Toh & Miller, 2016). Therefore, a certain level of uncertainty hinders people to endorse novelty, and makes them focus more on conventional and previously successful options in order to reduce risk (Dailey & Mumford, 2007; Kornilova & Kornilov, 2010; Mueller et al., 2012).

However, people differ in the way they are able to cope with the perception of uncertainty (Furnham & Ribchester, 1995). Individuals' level of intolerance for uncertainty (i.e., the extent to which one has a lack of confidence and certainty in the context of insufficient information) predicts creative performance (e.g., creative abilities, creative idea evaluation; Kornilova & Kornilov, 2010;

Zenasni, Besançon, & Lubart, 2008). Whereas tolerance for uncertainty positively influences creativity, intolerance for uncertainty impedes it (Erez & Nouri, 2010; Kornilova & Kornilov, 2010). Furthermore, Mueller et al. (2012) showed that situations with low uncertainty tolerance result in higher levels of implicit bias against originality relative to practicality as compared to situations involving high tolerance for uncertainty. Consequently, if individuals with high levels of implicit bias against originality evaluated under low uncertainty tolerance circumstances, they experienced more difficulty with recognizing and appreciating ideas' level of originality relative to practicality. They have the tendency to underestimate the true value of highly original ideas (Licuanan, Dailey, & Mumford, 2007). These arguments led to the following hypotheses:

H1. Intolerance for uncertainty negatively predicts the evaluation of an idea's originality.

H2. Intolerance for uncertainty positively predicts one's negative implicit associations towards originality relative to practicality (i.e., bias against originality relative to practicality).

2.4 Forecasting as uncertainty reduction strategy

As seen in the previous section (*2.3*), the perception of uncertainty hindered the recognition and appreciation of original ideas during idea evaluation. However, during the generation of new ideas (i.e., idea generation; Mumford et al., 1991), the development of creative ideas benefits from the attendance of uncertainty (Mueller et al., 2012). Therefore, each phase in creative thought may require a different uncertainty reduction strategy (e.g., ignoring uncertainty, knowledge generation, interaction, coping; Jordan & McDaniel Jr., 2014; Raadgever, Dieperink, Driessen, Smit, & Rijswick, 2011).

Since the perception of uncertainty has a negative influence on idea evaluation, this phase would logically benefit from a strategy that lowers these perceptions of uncertainty by gaining more insight in the situation, its influences, and possible outcomes (i.e., uncertainty reduction theory; Kramer, 1999; Kreye, 2016; Kuhlthau, 1993). This process of information seeking transfers individuals' feelings of uncertainty into understanding (Kramer, 1999; Kuhlthau, 1993), raises

confidence (Kuhlthau, 1993; Wilson, Ford, Ellis, Foster, & Spink, 2002), and helps to gain control over an uncertain situation (Wiltbank, Read, Dew, & Sarasvathy, 2009). Interestingly, higher levels of uncertainty motivate evaluators more to seek information (Kramer, 1999). Along these lines, individuals who are intolerant for uncertainty are more encouraged to solve the discomfort of uncertainty. Consequently, they are more engaged in the information seeking process to achieve clarity compared to individuals with higher levels of tolerance for uncertainty (Ashford & Cummings, 1985; Kornilova & Kornilov, 2010; Rosen & Knäuper, 2009).

A common strategy for idea evaluation that shares characteristics with information seeking with respect to new ideas' influences and possible outcomes is forecasting. Forecasting is a psychological process in which individuals anticipate possible influences and consequences (e.g., positive and negative outcomes, additional benefits) of potential ideas (Byrne, Shipman, & Mumford, 2010). According to Byrne et al. (2010), "forecasting can be viewed as a complex form of prediction where neither predictors nor outcomes are fixed (p. 120)". Mumford, Lonergan, and Scott (2002) argued that idea evaluation should start with forecasting the possible consequences of potential ideas. Afterwards, the resulting forecast should be assessed with respect to a set of standards (e.g., originality and practicality in case of the evaluation of creative ideas). Following these steps is essential in order to make the right decision about implementing, revising, or dropping an idea which stimulates creative thought (Figure 2; Dailey & Mumford, 2006).

In addition, more extensive forecasts (i.e., a large number and variety of outcomes) were found to help evaluators to appraise ideas even better, and make more effective revisions, which eventually increases final solutions' originality, quality, and elegance (Byrne et al., 2010). They reviewed a set of forecasts with respect to 27 items (e.g., negative outcomes, appropriateness of forecast). A factor analysis revealed that five items contributed to the extensiveness of forecasts. The first item was to what extent evaluators mentioned the contribution of the solution to the problem (i.e., solution contribution). The second item, uniqueness of forecast, was focused on whether the forecast included potential outcomes or consequences that were not mentioned in other forecasts. Specificity of outcomes, the third item, referred to the extent possible outcomes were written down in detail. The fourth item, considering additional benefits, was focused on outcomes that did not directly contribute

to the problem, but had an added value for the organization or user. The last item contributing to extensive forecasting was the number of outcomes.

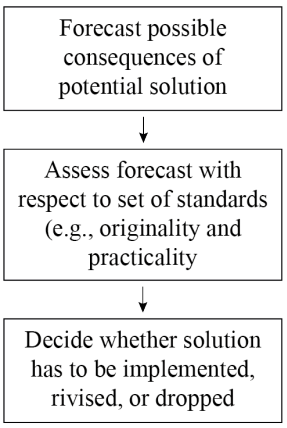


Figure 2. Idea evaluation process according to Mumford, Lonergan, and Scott (2002)

In conclusion, since originality causes feelings of uncertainty (Amabile, 1996), and thus serves as an uncertainty trigger (De Bruin, Rassin, & Muris, 2006), it was expected that individuals with higher levels of intolerance for uncertainty (and likely to be more implicitly biased against originality relative to practicality) produce more extensive forecasts. Moreover, if forecasting could indeed serve as uncertainty reduction strategy, a mitigated implicit bias against originality relative to practicality was expected, since this implicit bias is predominantly driven by the perception of uncertainty concerning original ideas. These expectations led to the following hypotheses:

H3. Intolerance for uncertainty positively predicts the extensiveness of forecasts.

H4. Extensive forecasting will reduce individuals' implicit bias against originality relative to practicality, and could therefore be seen as an uncertainty reduction strategy.

Assuming that forecasting could be seen as an uncertainty reduction strategy, and therefore could reduce individuals' implicit bias against originality relative to practicality (H4), a final effect could be expected. A lower implicit bias against originality relative to practicality makes individuals more

open to original ideas (Mueller et al., 2012), and makes them more willing to take risks (Reiter-Palmon, Kennel, & Kaufman, 2018). Knowing that extensive forecasting during idea evaluation contributes to better idea evaluation (i.e., quality, originality, and elegance; Byrne et al., 2010), reduced feelings of uncertainty measured as a lower implicit bias against originality relative to practicality could serve as the mediating factor to explain this relationship. Hence, a mitigated implicit bias against originality relative to practicality could make individuals more open for original ideas, and consequently improve their evaluation of an idea's originality. This would help organizations and institutions to recognize and appreciate original ideas more easily (Mueller et al., 2012). These observations led to the final, fifth hypothesis. Figure 3 shows the complete conceptual model.

> **H5.** A mitigated implicit bias against originality relative to practicality will improve the evaluation of an idea's originality.

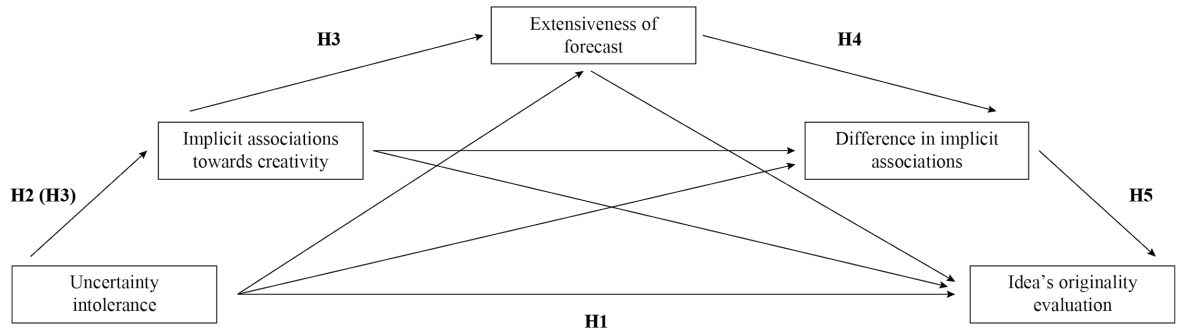


Figure 3. Conceptual model

3. Method

To examine the extent to which forecasting during idea evaluation could be seen as an uncertainty reduction strategy to lower individuals' implicit bias against originality relative to practicality in order to improve their evaluation of an idea's originality, an experimental study was set up using both quantitative and qualitative techniques.

3.1 Participants

The sample consisted of 80 participants (M_{age} = 23.01, SD_{age} = 5.61). They were recruited using the Human Subjects Pool of Tilburg School for Humanities and Digital Sciences (N = 75), and by using convenience sampling (N = 5). The sample included 27 male participants, 52 female participants, and one participant who would rather not say. Undergraduates studying Communication and Information Sciences and Cognitive Sciences and Artificial Intelligence, who were recruited via the Human Subjects Pool, received course credits for their participation. Participants gathered via convenience sampling completed the experiment voluntary. One participant was excluded from the study, since his or her data included an extreme outlier which distorted the analyses.

3.2 Measures

3.2.1 Socio-demographics

The experiment included a set of questions concerning participants' socio-demographics, among which questions about their gender and age to get an idea of the characteristics of the sample. Furthermore, at the start of the experiment, participants were asked to indicate their English skills at a 5-point Likert scale (1 = very poor, 5 = very good). At the end of the experiment, participants were asked whether they faced difficulties with the English terminology used in the questions (i.e., not at all, very little, somewhat, to a great extent). Since the English language for most participants was not their native language, these questions were included as a check whether they understood the exercises correctly. If participants indicated that they thought their English skills were very poor (i.e., '4'), or faced difficulties during the experiment to a great extent, they would be excluded from the study. However, none of the participants had problems with the English language.

In addition, participants were asked to answer two questions concerning their education background and work experience in product development. These questions were included since high domain knowledge about a certain idea results in more accurate forecasts (e.g., ideas' impact, difficulties, and novelty; Dailey & Mumford, 2006). Consequently, more accurate forecasts positively affect the evaluation of creative ideas. Hence, these questions were included as control variables.

3.2.2 Intolerance for uncertainty

Prior studies (Ashford & Cummings, 1985; Kornilova & Kornilov, 2010; Mueller et al., 2012; Rosen & Knäuper, 2009) indicated that both forecasting and idea evaluation were influenced by one's intolerance for uncertainty. To assess whether one is able to cope with intolerance, the Intolerance of Uncertainty Scale (IUS; Freeston, Rhéaume, Letarte, Dugas, and Ladouceur, 1994) was used as measure ($\alpha = .88$). Evidence bearing on the internal consistency, and construct validity (e.g., convergent and discriminant validity) of the IUS as measure has been provided by Buhr and Dugas (2000), and Dugas, Freeston, and Ladouceur (1997), and Freeston et al. (1994). The IUS is a 27-item scale (e.g., 'Uncertainty stops me from having a strong opinion', 'Being uncertain means that a person is disorganized'). Participants had to indicate the extent to which the items were applicable to them on a 5-point Likert scale (1 = not at all characteristic of me; 5 = entirely characteristic of me). A higher score equalized higher intolerance for uncertainty (minimum score = 27, maximum score = 189). The full scale could be found in Appendix C (question 7).

3.2.3 Individuals' bias against originality

Prior study showed the negative effect of an implicit bias against originality relative to practicality on neutral idea evaluation (Mueller et al., 2012). This study focused on the factors to mitigate this implicit bias. To assess one's implicit bias against originality relative to practicality, the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was used. This measure takes participants' speed of response into account to determine the strength of mental associations toward certain subjects. To measure one's mental associations with originality and practicality, the same categories were used as in research by Mueller et al. (2012). The two attitude objects were *creativity*

(i.e., target A; originality) and *practicality* (i.e., target B). The two evaluative dimensions were *good* and *bad*. Related to *originality* (i.e., *creativity* as attitude), the words *novel, creative, inventive,* and *original* were used. *Practicality* was associated with *practical, functional, constructive,* and *useful.* Words related to *good* were *rainbow, cake, sunshine, laughter, peace,* and *heaven*, whereas *bad* was associated with *vomit, hell, agony, rotten, poison,* and *ugly.* Participants had to use the 'E' and 'I' key on the keyboard to classify one of the words in italic to either (1) originality or practicality, (2) good or bad, or (3) a combination of both. Appendix E shows four example screens derived from this first IAT.

The output of the IAT was analyzed using the *D* statistic ranging from -2 to +2 (Greenwald, Nosek, & Banaji, 2003), which reduced the chance on influences of procedural variables and cognitive ability (Cai, Sriram, Greenwald, & McFarland, 2004). A positive score (i.e., target A + positive; target B + negative) indicated positive associations toward originality, negative associations toward practicality (i.e., implicit bias against practicality relative to originality). A negative score (i.e., target A + negative; target B + positive) suggested positive associations toward practicality, negative associations toward originality (i.e., implicit bias against originality relative to practicality; Greenwald et al., 2003).

Since participants' implicit associations toward originality were measured two times, a possible learning effect could occur. Therefore, the second IAT was slightly changed regarding the words that should be associated with good and bad. This time *good* was related to *joy, love, pleasure, peace, wonderful,* and *excellent*, and *bad* was associated with the words *rotten, angry, terrible, bomb, nasty,* and *hate* (Wilson & Scior, 2014).

However, people performed differently on an implicit test measuring one's associations toward originality and practicality as compared to an explicit test (Mueller et al., 2012). This difference could be explained by the fact that individuals have multiple attitudes toward a certain topic. Implicit tests are able to reveal more ingrained attitudes, whereas explicit tests show more contemporary associations (Payne, Burkley, & Stokes, 2008). One's explicit associations towards originality and practicality could serve as input for possible further data exploration, and therefore an explicit test was also included in the experiment. One's explicit bias against originality relative to

practicality was measured with a self-rate Explicit Association Test (EAT; Mueller et al., 2012). Participants were asked to indicate to what extent they thought originality and practicality were important aspects of an idea on a 7-point scale (1 = strongly negative, 7 = strongly positive). *Originality* was measured using the words *creative, inventive, original,* and *novel (*$\alpha_{EAT\ before}$ = .67, $\alpha_{EAT\ after}$ = .73), whereas *practicality* was measured using the words *practical, functional, constructive,* and *useful* ($\alpha_{EAT\ before}$ = .56, $\alpha_{EAT\ after}$ = .53). Explicit bias against originality relative to practicality was calculated by subtracting the score on practicality from the score on originality, meaning that a negative score indicated a bias against originality relative to practicality (Mueller et al., 2012). The order in which the words related to originality and practicality were asked, was reversed in the second survey to reduce a possible testing effect.

3.2.4 Extensiveness of forecasts

The extent to which participants elaborate their forecasts was expected to be influenced by their level of intolerance for uncertainty (Ashford & Cummings, 1985; Kornilova & Kornilov, 2010; Rosen & Knäuper, 2009), and consequently, the extensiveness of forecasts was expected to influence idea evaluation through a mitigated implicit bias against originality relative to practicality (Mueller et al., 2012). To measure the extensiveness of forecasts, participants were asked to forecast the potential influences and consequences of a premeditated idea (i.e., a running shoe with nanotechnology that adjusts fabric thickness to cool the foot and reduce blisters; Mueller et al., 2012). Byrne, Shipman, and Mumford (2010) reported that five aspects (out of a list of 27 items) contribute to the extensiveness of a forecast, i.e., (1) solution contribution, (2) uniqueness of forecast, (3) specificity of outcomes, (4) additional benefits, and (5) number of outcomes (α = .59). Therefore, the forecasts were assessed using these five items as rating criteria.

The extent to which an individual item was elaborated in a forecast was scored on a 5-point Likert scale (1 = no discussion, 5 = extensive and explicit discussion). These rating scales were created using the same benchmark rating scales technique as Byrne et al. (2010) worked with. Prior research showed that these benchmark rating scale scored frequently high on inter-reliability (Byrne et al., 2010; Redmon, Mumford, & Teach, 1993), which suggests that these scales are a clear and easy to

use rating method. An example of a benchmark rating scale for solution contribution can be found in Figure 4. The full list of benchmark rating scales for all five items could be found in Appendix G.

The forecasts were assessed with respect to the five items by both the researcher and an external judge (15% of the 80 forecasts) to see whether there existed consensus in both ratings, and thereby improve this study's reliability. The external judge was familiarized with the nature of the forecasting task and the relevant benchmark rating scales. Cohen's κ was run to determine if there was agreement between the two raters' judgement on the extent to which the separate items were elaborated. Following the guidelines by Landis and Koch (1977), there was an almost perfect agreement between the two raters, $\kappa = .813$, 95% BCa CI [0.68, 0.92], $p < .001$ (Appendix F).

Solution contribution

Definition: The extent to which the participant discusses the contribution of the solution to the problem.

Rating scale

1. No discussion within the forecast on solution contribution.
2. Some discussion within the forecast on solution contribution. Participant minimally considers the contribution of the solution to a problem, but is not specific.
3. Moderate discussion within the forecast on solution contribution. Participant considers the contribution of the solution to the problem, but does not consider the impact on certain actions.
4. Fair amount of discussion within the forecast on solution contribution. Forecast is largely focused around this consideration. Participant describes in some detail how the solution can contribute to the problem.
5. Extensive and explicit discussion within the forecast on solution contribution. This consideration is discussed in depth and is a major focus within the forecast.

Figure 4. Example of benchmark rating scale for solution contribution

A more detailed reliability check revealed that the scale's reliability would improve (from $\alpha = .59$ to $\alpha = .77$) when solution contribution as item would be deleted, meaning that the chance of similar results under consistent conditions would increase. The difference in reliability due to the deletion of solution contribution suggests that this item does not measure the same construct as the other four items did. A correlation analysis confirmed this assumption; solution contribution did not correlate with any of the other included items (i.e., not significant and below .30; Table 1), while the

other items did. Therefore, it was decided to exclude this item to determine the extensiveness of a forecast. This means that extensive forecasting was measured by assessing (1) uniqueness of forecast, (2) specificity of outcomes, (3) additional benefits, and (4) number of outcomes.

Table 1

Correlation table individual items as part of extensive forecasting

		M	SD	α if item deleted	1	2	3	4	5
1	Number of outcomes	2.36	1.12	.307					
2	Uniqueness of forecast	1.50	0.87	.554	.410**				
3	Solution contribution	2.11	1.07	.769	-.173	-.088			
4	Additional benefits	2.06	1.32	.415	.648**	.293**	-.140		
5	Specificity of outcomes	2.35	1.19	.440	.693**	.195	-.161	.446**	

**. Correlation is significant at the 0.01 level (2-tailed).

3.2.5 The evaluation of an idea's originality and practicality

Idea evaluation was expected to be influenced by intolerance for uncertainty (Kornilova & Kornilov, 2010), one's implicit associations towards originality relative to practicality (Mueller et al., 2012), and extensiveness of forecasts (Byrne et al., 2010). Therefore, a creative idea evaluation task was included. The idea of a new running shoe that adjusts fabric thickness to cool the foot and reduce blisters, the same idea as used for the forecasting task, was subject for participants' creative idea evaluations. Mueller et al. (2012) tested this idea's originality (M = 5.62, SD = 1.02) and practicality (M = 5.85, SD = 0.92) on a 7-point Likert scale. These scores indicated that the idea is both highly original and practical, meaning that it is a creative idea (Amabile, 1983). In this study, this creative idea evaluation task was carried out in the same manner as Mueller et al. (2012). Originality was measured using the words *creative, inventive, original,* and *novel* (α = .84), and practicality was

measured using the words *practical, functional, constructive,* and *useful* (α = .81), both on a 7-point Likert scale (1 = not at all, 7 = extremely so).

3.2.6 Uncertainty check

To measure directly whether participants evaluated the idea of the new running shoe under consideration as being uncertain about the idea, an uncertainty check was included. This measure was not part of the original model, since feelings of uncertainty were indirectly measured using one's implicit associations towards originality relative to practicality. In case no relationships between these implicit associations and the other variables were found, the uncertainty check could serve as a direct measure of one's uncertainty feelings during idea evaluation for further data exploration. The check consisted of three items measured on a 7-point scale (1 = not at all, 7 = very much so; Mueller et al., 2012), namely 'I'm uncertain about whether this idea will be successful', 'I'm uncertain about whether this idea will fail', and 'I feel uncertain about this idea'. The reliability of the scale in this study was questionable (α = .60). However, since the uncertainty check is an existing scale (α = .78; Mueller et al., 2012), and could be of importance in the data analysis, it was decided to include the scale anyway.

3.3 Materials

The forecasting task was introduced using an 'everyday' situation rather than only presenting the static idea to increase ecological validity. Participants received instructions for the forecasting task via an email from a product developer at the sports brand Nike asking for their help. Nike came up with an idea for a new running shoe with nanotechnology that adjusts fabric thickness to cool the foot and reduce blisters as a reaction to customers' complaints about sore feet caused by other Nike running shoes. The email ended with a request toward the participants asking for their thoughts about the possible outcomes and consequences of this idea (i.e., forecast the outcomes). The instructions for the forecasting task were similar to the instruction mail in the study by Byrne et al. (2010). The aim of these instructions was to inform participants that they only had to write down the possible consequences and outcomes of the idea instead of writing down what they thought about the idea

itself (e.g., good or bad, original or practical). This would already be part of the evaluation process which was asked later in the experiment. The full email could be read in Figure 5.

From: productdevelopment@nike.com
To: anne@nike.com
Subject: new product idea

Hi,

My name is Rebecca Venner, and I am a product developer at Nike. Unfortunately, our clients are increasingly complaining that they have sore feet because of their Nike running shoes. Therefore, we are trying to develop a new product. We are now thinking of **a running shoe with nanotechnology that adjusts fabric thickness to cool the foot and reduce blisters.** To help me get up to speed, and to be sure whether this is a good idea, it would be very helpful if you could help me evaluate this new idea. I want you to tell me exactly what you expect to happen as a result of the idea. If you could, please include anything that you anticipate as an outcome for the idea. Telling me how you think the idea will play out will help me tremendously.

Thank you very much,

Rebecca Venner
Product developer Nike
Colosseum 1, 1213 NL
Hilversum, the Netherlands

Figure 5. Instruction email for the forecasting task

3.4 Procedure

Upon arrival, participants received and read the instructions digitally informing them about the duration and procedure of the study, and signed informed consent stating that their data would be kept anonymously and confidentially (Appendix A). The aim of the study was withheld for the participants until they finished the experiment. The study was approved by the Research Ethics and Data Management Committee. The complete study was run on a laptop using two separate surveys created in Qualtrics (Appendix C and D) and Microsoft Word (Figure 5), and lasted approximately half an hour.

First, participants were asked to answer socio-demographic questions. Subsequently, participants completed the Intolerance of Uncertainty Scale. Then, participants' implicit and explicit bias against originality relative to practicality were measured. These implicit and explicit tests ended the first survey in Qualtrics. When one had ended the first part of the experiment, the researcher guided the participant to the second part in Microsoft Word. A short verbal instruction was given about the forecasting task. These instructions could be read in the mail as well (Figure 5). Participants had to work for five minutes on this exercise in order to be sure that they really paid attention to it. When the five minutes were over, the researcher guided the participant to the third part of the experiment, which was the second survey in Qualtrics. Again, participants' implicit and explicit bias against originality relative to practicality were measured. Afterwards, they were asked to evaluate the idea which was presented in the forecasting task on originality and practicality. The final part of this second survey in Qualtrics included the uncertainty check and the closing question whether participants faced difficulties regarding the English terminology used in the experiment.

At the end of the experiment, participants had to sign the debriefing (Appendix B) and were thanked for their participation. Figure 6 shows a schematic visualization of the full procedure.

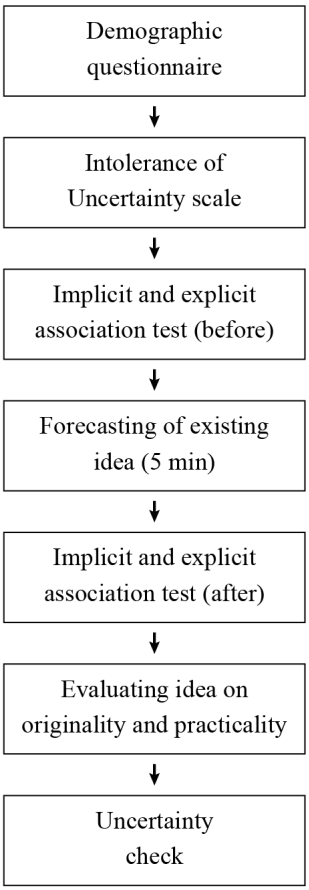


Figure 6. Schematic visualization of the experiment's procedure

3.5 Analyses

The data analysis started with checking whether assumptions of normality and linearity were met, and whether there were significant correlations between variables as a starting point for hypothesis testing. Subsequently, a series of Hayes mediation analyses for the estimation of indirect effects (PROCESS macro for SPSS; Hayes, 2013) was used to test the conceptual model (H1 - H5; see *4.2*) and further data exploration (see *4.3*). It is of note that in all analyses, an outcome was mentioned if it was significant at the .05 level. The number of bootstrapped samples was 5000. All analyses were conducted using SPSS 24.0.

4. Results

4.1 Descriptives, statistics, and controls

Table 2 shows the descriptives, correlations and reliability intervals of the variables in this study. Participants rated themselves as being biased against (i.e., explicitly) originality relative to practicality (M = -0.31, SD = 0.72), while the results from the Implicit Association Test indicated that they have positive associations toward originality relative to practicality (M = 0.41, SD = 0.39). More specifically, thirteen participants (N = 80) turned out to be implicitly biased against originality relative to practicality. On the contrary, 43 participants rated themselves as being biased against originality relative to practicality.

Experience in product development was included as control variable. However, experience in product development was not related to any of the involved variables (Table 2). Therefore, it was decided to leave this control variable out of the mediation analyses.

4.2 Hypothesis testing

It was expected that the effect of intolerance for uncertainty on the evaluation of an idea's originality was indirectly caused by the difference in implicit associations towards originality relative to practicality as a consequence of extensive forecasting (Figure 3). However, since none of the involved variables correlated with each other (Table 2), this mediated effect was not likely to find. To test whether the effect of intolerance for uncertainty on the evaluation of an idea's originality was indeed mediated by the difference in implicit associations towards originality relative to practicality and extensive forecasting, a sequential mediation analysis was performed (Hayes, 2013). The assumptions of linearity, homoscedasticity, and normality were met. First, as can be seen in Figure 7, intolerance of uncertainty did not predict one's associations toward originality relative to practicality (b = -0.001, t = -0.29, p = .769). Subsequently, no effect was found between implicit associations toward originality relative to practicality and the extensiveness of forecasts (b = -0.07, t = -0.29, p = .774), nor between extensiveness of forecasts and the difference in implicit associations toward originality relative to practicality (b = -0.05, t = 1.33, p = .186). Finally, the difference in implicit associations did not affect the way individuals evaluated an idea's originality (b = -0.15, t = -0.44, p = .660).

Table 2

Descriptives, statistics, and controls

		M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Intolerance of Uncertainty	66.05	13.75	(.88)													
2	Implicit Association Test 1	0.41	0.39	-.033													
3	Extensiveness forecast	2.07	0.87	-.084	-.030	(.77)											
4	Number of outcomes	2.36	1.12	-.053	-.006	.903**											
5	Uniqueness of forecast	2.36	1.12	-.213†	-.195†	.558**	.410**										
6	Additional benefits	2.06	1.32	-.101	-.002	.810**	.648**	.293**									
7	Specificity of outcomes	2.35	1.20	.070	.063	.780**	.693**	.195†	.446**								
8	IAT difference	-0.10	0.38	.074	-.580**	.135	.097	.112	.107	.104							
9	Idea's originality	5.42	0.93	-.191†	-.107	.202†	.286*	-.033	.275*	.045	.035	(.84)					
10	Idea's practicality	5.08	1.10	.097	-.032	.261*	.131	.130	.437**	.063	.034	.082	(.81)				
11	Uncertainty check	4.22	1.18	.226*	.085	-.370**	-.209	-.228*	-.362**	-.322**	-.001	.166	-.340**	(.60)			
12	Explicit Association Test 1	-0.31	0.72	-.014	.280*	.093	.051	.241*	.101	-.064	.059	-.050	.139	-.017			
13	EAT difference	0.03	0.47	-.034	-.085	.052	.090	.074	.049	-.041	.002	-.055	-.120	-.148	.106		
14	Experience in product development	1.75	0.44	.175	.101	-.112	-.098	-.133	-.127	0	-.244*	.138	-.005	.191	.134	-.058	

Note. $N = 80$. Cronbach's alpha values (α) are displayed in the table between parentheses with the corresponding variable.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

†. Correlation is significant at the 0.1 level (2-tailed).

A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect (b = -0.001) crossed zero [-0.006, 0.004]. In addition, the direct effect was also not significant (b = -0.01, t = -1.58, p = .119). Hence, since there was no significant direct or indirect effect, the five hypotheses could not be supported by the data.

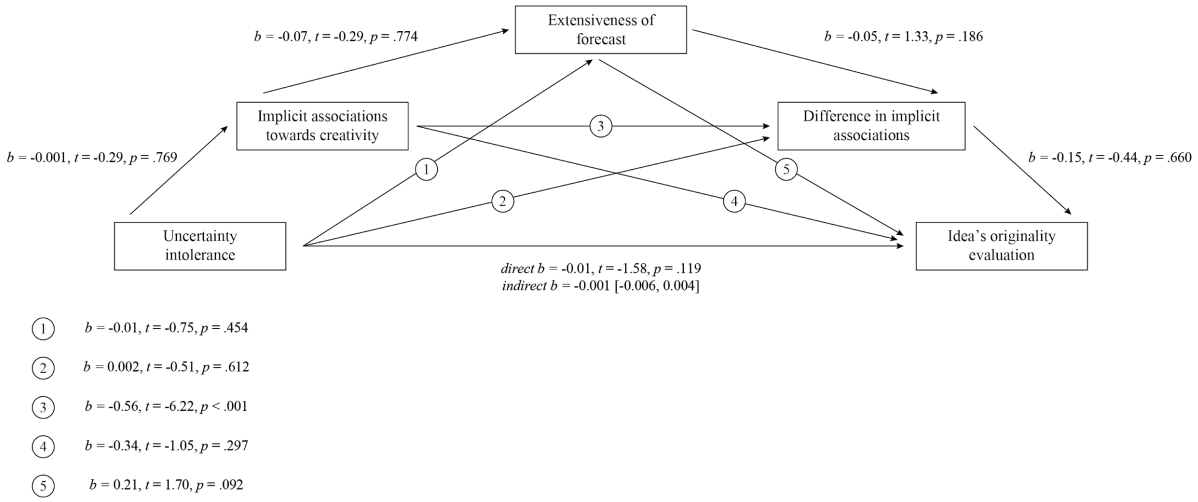


Figure 7. Model of intolerance for uncertainty as predictor of the evaluation of an idea's originality, mediated by one's implicit associations towards originality and the extensiveness of forecasts. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

4.3 Further exploration of the data

Since the data showed no evidence for any of the five hypotheses, it was decided to further explore the data in order to search for other possible existing relationships. Table 2 showed that the uncertainty check (i.e., whether participants felt uncertain during idea evaluation) was related to the intolerance for uncertainty, the extent to which a forecast was elaborated, and the evaluation of an idea's practicality. The next sections (4.3.1 and 4.3.2) are focused on these relationships.

4.3.1 Effect of extensive forecasting on idea evaluation through feelings of uncertainty

Neither one's intolerance for uncertainty, nor implicit bias against originality relative to practicality were related to the extensiveness of forecasting. However, the extent to which participants felt

uncertain while evaluating (i.e., uncertainty check) was found to be negatively related to the extensiveness of forecasts, $r = -.370$, $p = .001$. This relationship suggests that extensive forecasting reduced feelings of uncertainty during idea evaluation, which implies that forecasting could indeed serve as an uncertainty reduction strategy.

The Implicit Association Test showed no difference in associations towards originality due to extensive forecasting. The uncertainty check could be used to directly test the effect of extensive forecasting on one's feelings of uncertainty during idea evaluation. To test whether reduced feelings of uncertainty could explain the relationship between extensive forecasts and a more positive evaluation of an idea's originality, a simple mediation analysis (Hayes, 2013) was performed using the uncertainty check instead of the Implicit Association Test. The assumptions of linearity, homoscedasticity, and normality were met. First, as could be seen in Figure 8, extensive forecasts caused lower feelings of uncertainty ($b = -0.50$, $t = -3.52$, $p < .001$), and lower feelings of uncertainty were subsequently related to a lower evaluation of an idea's originality ($b = 0.22$, $t = 2.41$, $p = .018$). A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect ($b = -0.11$) was entirely below zero [-0.23, -0.02]. In addition, since the direct effect was found to be significant ($b = 0.33$, $t = 2.63$, $p = .010$), feelings of uncertainty did partially influence the effect of extensive forecasting on the evaluation of an idea's originality.

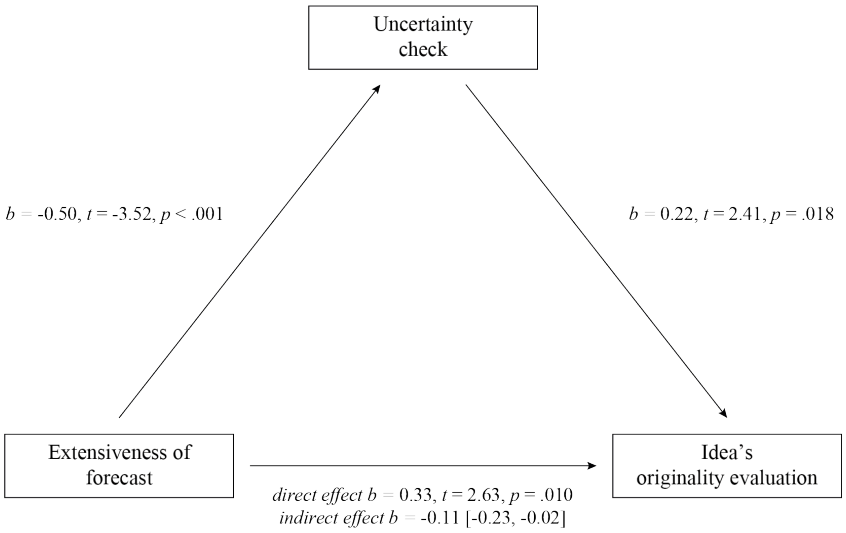


Figure 8. Model of extensive forecasts as predictor of the evaluation of an idea's originality, mediated by feelings of uncertainty. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

To test the effect of reduced uncertainty feelings on idea's practicality, and to check whether the reversed interplay between the evaluation of an idea's originality and practicality occurred, another simple mediation analysis was performed with the extensiveness of forecasting as predictor, the evaluation of an idea's practicality as outcome, and uncertainty check as mediator (Hayes, 2013). The assumptions of linearity, homoscedasticity, and normality were met. First, as can be seen in Figure 9, extensive forecasts caused lower feelings of uncertainty (b = -0.50, t = -3.52, p < .001), and lower feelings of uncertainty were subsequently related to a higher evaluation of an idea's practicality (b = -0.26, t = -2.48, p = .016). A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect (b = 0.13) was entirely above zero [0.03, 0.28]. Since the direct effect is not significant (b = 0.20, t = 1.37, p = .174), it is likely to assume that the positive effect of extensive forecasting on the evaluation of an idea's practicality is entirely due to reduced feelings of uncertainty.

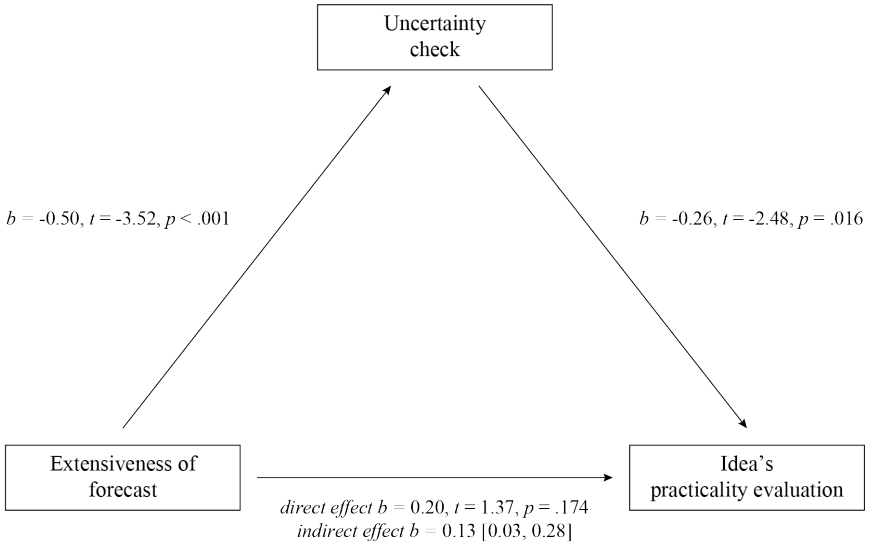


Figure 9. Model of extensive forecasts as predictor of the evaluation of an idea's practicality, mediated by feelings of uncertainty. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

4.3.2 Effect of intolerance for uncertainty on idea evaluation through extensive forecasting and feelings of uncertainty

The original model (H1 - H5) included the expectation that the effect of intolerance for uncertainty on the evaluation of an idea's originality was mediated by one's implicit bias against originality relative to practicality and extensive forecasting. Whereas no difference in one's implicit bias occurred due to the extent to which forecasts were elaborated, a difference was found in the way participants rated themselves as feeling uncertain as a result of the extensiveness of their forecasts (see 4.3.1). Furthermore, extensive forecasts had an effect on the evaluation of an idea's originality and practicality. In addition, intolerance for uncertainty appeared to be related to the uncertainty check and the evaluation of an idea's originality. Therefore, to test whether the effect of intolerance for uncertainty on the evaluation of an idea's originality could be explained by extensive forecasting and reduced feelings of uncertainty, a sequential mediation analysis (Hayes, 2013) was performed for further exploration. The new model can be found in Figure 10, including the output from the sequential mediation analysis.

Assumptions of linearity, homoscedasticity, and normality were met. Intolerance for uncertainty did not influence the extent to which forecasts were elaborated (b = -0.01, t = -0.75, p = .457). Extensive forecasting was again found to lower feelings of uncertainty (b = -0.48, t = -3.40, p = .001), and lower feelings of uncertainty were subsequently related to a lower evaluation of an idea's originality (b = 0.26, t = 2.89, p = .005). A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect (b = .003) crossed zero [-0.002, 0.01], indicating a non-significant effect. The direct effect was found to be significant (b = -0.02, t = -2.24, p = .028).

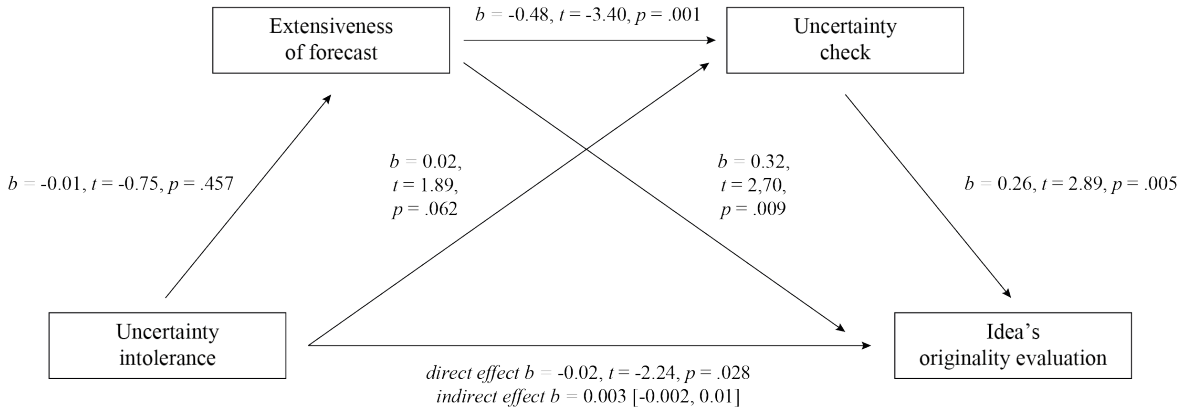


Figure 10. Model of intolerance for uncertainty as predictor of the evaluation of an idea's originality, mediated by the extensiveness of forecasts and feelings of uncertainty. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples.

5. Discussion

This study tried to examine whether forecasting during idea evaluation could be seen as an uncertainty reduction strategy to mitigate individuals' implicit bias against originality relative to practicality in order to improve their evaluation of an idea's originality. As concluded by Toh and Miller (2016), people have an ingrained desire to ignore highly original ideas, since these ideas are associated with uncertainty. This implicit bias against originality relative to practicality is thought to impede the creative idea evaluation process, since it hinders evaluators to recognize and value ideas' true original value. Consequently, potential successful original solutions are more likely to be rejected rather than implemented (Mueller, Melwani, & Goncalo, 2012). Forecasting during idea evaluation was expected to mitigate this implicit bias, since forecasting shares characteristics with information seeking (e.g., thinking about possible outcomes, consequences) which is an uncertainty reduction strategy (Kramer, 1999; Kreye, 2016; Kuhlthau, 1993).

No implicit bias against originality

Inconsistent with the studies by Mueller et al. (2012) and Toh and Miller (2016), this study was not able to replicate the finding that most people have an implicit bias against originality relative to practicality. Whereas Mueller et al. (2012) and Toh an Miller (2016) stated that evaluators explicitly state that they think originality is an important aspect of an idea, but show negative implicit associations toward it (Mueller et al., 2012), this study's results showed the opposite. Only thirteen participants appeared to be implicitly bias against originality relative to practicality irrespectively of their level of tolerance for uncertainty ($N = 80$), while the explicit association test showed that 43 participants rated themselves as being biased against it. Since the original model (H1 - H5) included the assumption that a bias against originality relative to practicality could partly explain the relationship between intolerance for uncertainty and the evaluation of an idea's originality, the non-significant findings of the mediation analysis might be clarified by the low number of evaluators who were implicitly biased against originality relative to practicality. This low number could be explained in two ways. First, the way creativity is assessed depends on evaluators' culture (Paletz & Peng, 2008). The study's sample by Mueller et al. (2012) consisted of American undergraduates, whereas

participants in this study were mainly Dutch students. Paletz and Peng (2008) concluded that, on average, American people have a stronger desire for appropriateness over novelty (i.e., bias against originality relative to practicality) as compared to Chinese and Japanese people who were more longing for novelty than appropriateness (i.e., no bias against originality). Future research could examine whether Dutch people are longing more for originality or practicality during creative idea evaluation as a possible underlying explanation for the results following from the Implicit Association Test.

A second explanation could be based on the fact that intolerance for uncertainty and one's implicit bias against either originality or practicality were unrelated. Whereas was expected that higher intolerance for uncertainty would result in a higher implicit bias against originality relative to practicality and vice versa (H2), based on the study by Kornilova & Kornilov (2010), no significant relationship was found. Mueller et al. (2012) did find a higher implicit bias against originality relative to practicality when they manipulated the level of uncertainty in a situation. Taken together, there might be a relationship between intolerance for uncertainty and one's implicit bias against originality relative to practicality which has to be triggered by uncertainty in a situation. This interaction might be interesting for future research.

No relationship between IUS and forecasting

Additionally, it was expected that individuals with higher levels of intolerance for uncertainty (i.e., more biased against originality relative to practicality) would produce more extensive forecasts (H3). However, no significant correlation was found between one's level of intolerance for uncertainty and the extent to which forecasts were elaborated, nor between one's implicit associations towards originality relative to practicality and the extent to which forecasts were elaborated. A possible explanation for this could be that the amount of information sought by individuals depends on the perception of ambiguity in a situation (Ladouceur, Talbot, & Dugas, 1997). Individuals with higher levels of intolerance for uncertainty were found to seek for more information to solve the discomfort of uncertainty in moderately ambiguous situations rather than low or high ambiguous situations. It might be the case that the instruction email participants received in this study was perceived as low or

highly ambiguous instead of moderate. Future research could examine whether the amount of information given in the instructions for a forecasting task could cause a relationship between one's intolerance for uncertainty and the extensiveness of his or her forecast.

Uncertainty feelings during idea evaluation as mediating factor

Extensive forecasting was expected to reduce individuals' implicit bias against originality relatively to practicality (H4). However, contrary to this expectation, one's implicit associations toward originality or practicality (i.e., indirect measure) were unrelated to the extensiveness of forecasting. Further data exploration showed that feelings of uncertainty (i.e., direct measure) during idea evaluation appeared to be a mediating factor between the extensiveness of forecasts and idea evaluation for both originality and practicality. More extensive forecasts were found to make evaluators more certain about an idea, meaning that forecasting could indeed be seen as an uncertainty reduction strategy as expected based on research by Kramer (1999), Kreye (2016), and Kuhlthau (1993).

These raised feelings of certainty subsequently decreased individuals' evaluation regarding ideas' originality, whereas the opposite effect was expected (H5). Inconsistent with the expectations, people who were uncertain about the idea were more positive about this idea's originality. On the contrary, feelings of uncertainty about the idea resulted in a lower assessment of the idea's practicality. A possible explanation for these contradictory findings could be that, as the Implicit Association Test indicated, the vast majority of the participants was not implicitly biased against originality relative to practicality, but showed positive associations toward it. As stated in (Bower, 1981), this implicit bias against originality relative to practicality causes an evaluation bias. Knowing that in this study, idea evaluation was indeed not influenced by an implicit bias against originality relative to practicality, other factors might have affected the way individuals evaluated the idea's originality and practicality. In addition, participants could have recognized the high originality of the idea (i.e., 5.62 out of 7; Mueller et al., 2012), which is by definition equal to higher uncertainty, since an original idea is relative new and untested (Amabile, 1996). Therefore, people who evaluated the idea as highly original could have associated this level of originality with higher levels of uncertainty about the idea. On the contrary, individuals who thought the idea was considerably practical, could

have seen this as a safe, certain idea (Toh & Miller, 2016). This reversed interplay could subsequently be explained by the negative correlation between originality and practicality (Nijstad, De Dreu, Rietzschel, & Baas, 2010).

Limitations

Before turning to the broader conclusion of this study, certain limitations should be noted. To begin, in this study, participants were provided with a premeditated idea. Research showed that evaluators are more correct when assessing others' ideas (i.e., interpersonal evaluation) as compared to their own ideas (i.e., intrapersonal evaluation; Benedek et al., 2016). In addition, Dailey and Mumford (2006) and Runco and Vega (1990) concluded that interpersonal evaluation positively relates to individuals' divergent thinking skills. This study only tested participants' interpersonal evaluation skills. In addition, most research on forecasting used as a base in the theoretical framework (e.g., Byrne, Shipman, & Mumford, 2010) was focused on intrapersonal evaluation. These different manners of idea evaluation (i.e., interpersonal vs intrapersonal) could have harmed this study's convergent validity. However, the effects that were sought for in this study were not primarily focused on the accurateness of one's evaluating skills.

Another limitation of this study was a noticeable homogenous sample. Therefore, this sample might give a distorted representation of the Dutch population, which might have harmed the population (i.e., external) validity. More specifically, Benedek et al. (2016) identified that both higher intelligence and language competence help to estimate an idea's true original value. Higher intelligence and language competence seemed especially useful when original ideas were presented in a short verbal description (e.g., one short sentence) to discover semantic subtleties. Since all participants were following or already completed an academic education, their high levels of intelligence and language competence might have influenced their way of idea evaluation. Therefore, the effect of these high skills should be taken into account when interpreting this study's results.

A third limitation was the difference between the order in which questions were answered and the mediation analyses were performed. The uncertainty check was the closing scale in this study, which means that these questions were asked after participants had evaluated the idea. However, in

the mediation analyses the uncertainty check was used as predictor of idea evaluation, which means that the uncertainty check should have been asked before the evaluation task. Prior studies showed that feelings of uncertainty have an influence on individuals' evaluation process (Amabile, 1996; Dailey & Mumford, 2007; Rubenson & Runco, 1995). On the other hand, this order for the experiment was chosen based on assumption that feelings of uncertainty about an idea could be reported more easily after evaluating this idea. Therefore, the validity of causal interpretation might be harmed, and the found relations could possibly not be seen as causal relationships. However, the results showed that feelings of uncertainty during idea evaluation clearly affected idea evaluation.

Future work

The limitations could serve as interesting starting points for future research. Firstly, as mentioned before, this study tested individuals' interpersonal evaluation skills, while prior studies based their conclusions on intrapersonal evaluation skills (e.g., Benedek et al., 2016; Byrne et al., 2010; Runco & Vega, 1990). To check whether this study's results also apply to one's intrapersonal evaluation skills, this study could be replicated by adding the early cycle processes as proposed by Mumford, Mobley, Reiter-Palmon, Uhlman and Doares (1991) as well. Participants could be asked to come up with a set of potential solutions for a creative problem (i.e., early cycle processes), which they subsequently have to evaluate by making use of forecasting as strategy (i.e., late cycle processes). The rest of the method of this study could be the same. In that way, individuals' intrapersonal evaluation skills will be tested. In addition, individuals could also be asked about their divergent thinking skills, as proposed by Runco and Vega (1990).

Secondly, the order of the experiment and the analysis regarding the uncertainty check were not the same. Therefore, no causal relationships could be confirmed. However, both variables seemed to be related. Future research might explore the possible causal relationship of feelings of uncertainty on creative idea evaluation. In order to measure this possible causal relationship, participants' uncertainty feelings should be measured before they actually evaluate an idea.

Conclusion

This study tried to examine the extent to which forecasting could be seen as an uncertainty reduction strategy to mitigate individuals' implicit bias against originality relative to practicality. Subsequently, this mitigated implicit bias against originality would make evaluators more open for original ideas by improving their evaluation of an idea's originality. Although this study was not able to find support for the expected relationships, it did show an interesting relation between extensive forecasting, reduced feelings of uncertainty and idea evaluation (i.e., originality and practicality).

References

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology, 45*(2), 357-376. doi:10.1037/0022-3514.45.2.357

Amabile, T. M. (1996). *Creativity in context: Update to The Social Psychology of Creativity.* Boulder, CO, US: Westview Press

Ashford, S. J., & Cummings, L. L. (1985). Proactive feedback seeking: The instrumental use of the information environment. *Journal of Occupational Psychology, 58*(1), 67-79. doi:10.1111/j.2044-8325.1985.tb00181.x

Baas, M., De Dreu, C. K., & Nijstad, B. A. (2008). A meta-analysis of 25 years of mood-creativity research: Hedonic tone, activation or regulatory focus? *Psychological Bulletin, 134*(6), 779-806. https://doi.org/10.1037/a0012815

Benedek, M., Nordtvedt, N., Jauk, E., Koschmieder, C., Pretsch, J., Krammer, G., & Neubauer, A. C. (2016). Assessment of creativity evaluation skills: A psychometric investigation in prospective teachers. *Thinking Skills and Creativity, 21*, 75-84. https://doi.org/10.1016/j.tsc.2016.05.007

Berg, J. M. (2016). Balancing on the creative highwire: Forecasting the success of novel ideas in organizations. *Administrative Science Quarter, 61*(3), 433-468 https://doi.org/10.1177/0001839216642211

Blair, C. S., & Mumford, M. D. (2007). Errors in idea evaluation: Preference for the unoriginal? *Journal of Creative Behavior, 41*(3), 197-222. https://doi.org/10.1002/j.2162-6057.2007.tb01288.x

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36*(2), 129-148. http://dx.doi.org/10.1037/0003-066X.36.2.129

Byrne, C. L., Shipman, A. S., & Mumford, M. D. (2010). The effects of forecasting on creative problem-solving: An experimental study. *Creativity Research Journal*, *22*(2), 119-138. https://doi.org/10.1080/10400419.2010.481482

Cai, H., Sriram, N., Greenwald, A. G., & McFarland, S. G. (2004). The implicit association test's "D" measure can minimize a cognitive skill confound: Comment on McFarland and Crouch. *Social Cognition*, 22(6), 673-684. http//dx.doi.org/10.1521/soco.22.6.673.54821

Dailey, L. & Mumford, M. D. (2006). Evaluative aspects of creative thought: Errors in appraising the implications of new ideas. *Creativity Research Journal, 18*(3), 385-390. doi:10.1207/s15326934crj1803_11

Dugas, M. J., Freeston, M. H., & Ladouceur, R. (1997). Intolerance of uncertainty and problem orientation in worry. *Cognitive Therapy and Research, 21*(6), 593-606. https://doi.org/10.1023/A:1021890322153

De Bruin, G. O., Rassin, E., & Muris, P. (2006). Worrying in the lab: Does intolerance of uncertainty have predictive value? *Behaviour Change, 23*(2), 138-147. doi:10.1375/bech.23.2.138

Erez, M., & Nouri, R. (2010). Creativity: The influence of cultural, social, and work contexts. *Management and Organization Review, 6*(3), 351-370. doi:10.1111/j.1740-8784.2010.00191.x

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personal Individual Differences, 17*(6), 791-802. https://doi.org/10.1016/0191-8869(94)90048-5

Furnham, A., & Ribchester, T. (1995). Tolerance for ambiguity: A review of the concept, its measurements and applications. *Current Psychology, 14*(3), 179-199,. doi:10.1007/bf02686907

Greenwald, A. G., McGhee, D. E., & Schwartz, J.- L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74*(6), 1464-1480. doi:10.1037/0022-3514.74.6.1464

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analyses*. New York: The Guilford Press.

Hunter, S., Friedrich, T., Bedell, K., & Mumford, M. (2006). Creative thought in real - world innovation. *Serbian Journal of Management, 1*(1), 29-39

Jordan, M. E., & McDaniel Jr., R. R. (2014). Managing uncertainty during collaborative problem solving in elementary school teams: The role of peer influence in robotics engineering activity. *Journal of the Learning Sciences, 23*(4), 490-536. https://doi.org/10.1080/10508406.2014.896254

Kornilova, T. V., & Kornilov, S. A. (2010). Intelligence and tolerance/intolerance for uncertainty as predictors of creativity. *Psychology in Russia: State of the Art, 3*(1), 240-256

Kramer, M. W. (1999). Motivation to reduce uncertainty: A reconceptualization of uncertainty reduction theory. *Management Communication Quarterly, 13*(2), 305-316. https://doi.org/10.1177%2F0893318999132007

Kreye, M. E. (2016). *Uncertainty and Behaviour: Perceptions, Decisions and Actions in Business.* London, United Kingdom: Routledge

Kuhlthau, C. C., (1993). A principle of uncertainty for information seeking. *Journal of Documentation, 49*(4), 339-355. doi:10.1108/eb026918

Ladouceur, R., Talbot, F., & Dugas, M. J. (1997). Behavioral expressions of intolerance of uncertainty in worry: Experimental findings. *Behavior Modification, 21*(3), 355-371. https://doi.org/10.1177%2F01454455970213006

Landis, R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33*(1), 159-174. doi:10.2307/2529310

Licuanan, B. F., Dailey, L. R., & Mumford, M. D. (2007). Idea evaluation: Error in evaluating highly original ideas. *Journal of Creative Behavior, 41*(1), 1-27. doi:10.1002/j.162-6057-2007.tb01279.x

Lonergan, D. C., Scott, & G. M., Mumford, M. D. (2004). Evaluative aspects of creative thought: Effects of idea appraisal and revision standards. *Creativity Research Journal, 16*, 231-246. https://doi.org/10.1080/10400419.2004.9651455

Manske, M. E., & Davis, G. A. (1968). Effects of simple instructional biases upon performance in the unusual uses test. *The Journal of General Psychology, 79*(1), 25-33. http://dx.doi.org/10.1080/00221309.1968.9710449

Mueller, J. S., Melwani, S., & Goncalo, J. A. (2012). The bias against creativity: Why people desire but reject creative ideas. *Psychological Science, 23*(1), 13-17, https://doi.org/10.1177/0956797611421018

Mumford, M. D. (2001). Something old, something new: Revisiting Guilford's conception of creative problem solving. *Creativity Research Journal, 13*(3-4), 267-276. https://doi.org/10.1207/S15326934CRJ1334_04

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin, 103*(1), 27-43

Mumford, M. D., Lonergan, D. C., & Scott, G. M. (2002). Evaluating creative ideas: Processes, standards, and context. *Critical Inquiry, 22,* 21-30

Mumford, M. D., & McIntosh, T. (2017). Creative thinking processes: The past and the future. *The Journal of Creative Behavior, 51*(4), 317-322. https://doi.org/10.1002/jocb.197

Mumford, M. D., Mobley, M. I., Reiter-Palmon, R., Uhlman, C. E., & Doares, L. M. (1991). Process analytic models of creative capacities. *Creativity Research Journal, 4*(2), 91-122. doi:10.1080/10400419109534380

Nijstad, B. A., De Dreu, C. K. W., Rietzschel, E. F., & Baas, M. (2010). The dual pathway to creativity model: Creative ideation as a function of flexibility and persistence. *European Review of Social Psychology, 21*(2), 34-77. https://doi.org/10.1080/10463281003765323

O'neill, S. C., Demarco, T., Peshkin, B. N., Rogers, S., Rispoli, J., Brown, K., … Schwartz, M. D. - (2006). Tolerance for uncertainty and perceived risk among women receiving uninformative BRCA1/2 test results. *American Journal of Medical Genetics Part C: Seminars in Medical Genetics, 142*(4), 251-259. doi:10.1002/ajmg.c.30104

Paletz, S. B., & Peng, K. (2008). Implicit theories of creativity across cultures: Novelty and appropriateness in two product domains. *Journal of Cross-Cultural Psychology, 39*(3), 286-302. doi:10.1177/0022022108315112

Payne, B. K., Burkley, M. A., & Stokes, M. B. (2008). Why do implicit and explicit attitude tests diverge? The role of structural fit. *Journal of Personality and Social Psychology, 94*(1), 16-31. doi:10.1037/0022-3514.94.1.16

Raadgever, G. T., Dieperink, C., Driesen, P. P. J., Smit, A. A. H., Rijswick, H. F. M. W. (2011). Uncertainty management strategies: Lessons from the regional implementation of the water framework directive in the Netherlands. *Environmental Science & Policy, 14*(1), 64-75. https://doi.org/10.1016/j.envsci.2010.11.001

Reiter-Palmon, R., Kennel, V. L., & Kaufman, J. C. (2018). *Individual Creativity in the Workplace*. London, United Kingdom: Academic Press, an imprint of Elsevier

Rietzschel, E. F., Nijstad, B. A., & Stroebe, W. (2010). The selection of creative ideas after individual idea generation: Choosing between creativity and impact. *British Journal of Psychology, 101*(1), 47-68. https://doi.org/10.1348/000712609X414204

Rosen, N. O., & Knäuper, B. (2009). A little uncertainty goes a long way: State and trait differences in uncertainty interact to increase information seeking but also increase worry. *Health communication, 24*(3), 228-238. doi:10.1080/10410230902804125.

Rubenson, D. L., & Runco, M. A. (1995). The psychoeconomic view of creative work in groups and organizations. *Creativity and Innovation Management, 4*(4), 232-241. https://doi.org/10.1111/j.1467-8691.1995.tb00228.x

Runco, M. A., & Charles, R. E. (1993). Judgements of originality and appropriateness as predictors of creativity. *Personality and Individual Differences, 15*(5), 537-546. https://doi.org/10.1016/0191-8869(93)90337-3

Runco, M. A., Okuda, S. M., & Thurston, B. J. (1987). The psychometric properties of four systems for scoring divergent thinking tests. *Journal of Psychoeducational Assessment, 5*(2), 149-156. https://doi.org/10.1177/073428298700500206

Runco, M. A., & Vega, L. (1990). Evaluating the creativity of children's ideas. *Journal of Social Behavior and Personality, 5*(5), 439-452.

Shalley, C. E., & Gilson, L. L. (2004). What leaders need to know: A review of social and contextual factors that can foster or hinder creativity. *Leadership Quarterly, 15,* 33-53. https://doi.org/10.1016/j.leaqua.2003.12.004

Toh, C., & Miller, S. R. (2016). Choosing creativity: The role of individual risk and ambiguity aversion on creative concept selection in engineering design. *Research in Engineering Design, 27*(3), 195-219. https://doi.org/10.1007/s00163-015-0212-1

Watts, L. L., Mulhearn, T. J., Todd, M., & Mumford, M. D. (2017). Leader idea evaluation and follower creativity: Challenges, constraints, and capabilities. In M. D. Mumford & S. Hemlin (Eds.), *Handbook of Research on Leadership and Creativity* (pp.82-99). Cheltenham, UK: Edward Elgar Publishing

Wilson, M. C., & Scior, K. (2014). Attitudes towards individuals with disabilities as measured by the Implicit Association Test: A literature review. *Research in Developmental Disabilities, 35*(2), 294-321. doi:10.1016/j.ridd.2013.11.003

Wilson, T. D., Ford, N. J., Ellis, D., Foster, A. E., & Spink, A. (2002). Information seeking and mediated searching: Part 2. Uncertainty and its correlates. *Journal of the American Society for Information Science and Technology, 53*(9), 704-715. doi.10.1002/asi.10082

Wiltbank, R., Read, S., Dew, N., & Sarasvathy, S. D. (2009). Prediction and control under uncertainty: Outcomes in angel investing. *Journal of Business Venturing, 24,* 116-133. doi: 10.1016/j.jbusvent.2007.11.004

Zenasni, F., Besançon, M., & Lubart, T. (2008). Creativity and tolerance for ambiguity: An empirical study. *Journal of Creative Behavior, 42*(1), 61-73. https://doi.org/10.1002/j.2162-6057.2008.tb01080.x

Zhu, Y., Ritter, S. M., & Dijksterhuis, A. (2019). Creativity: Intrapersonal and interpersonal selection of creative ideas. *Journal of Creative Behavior, 0*(0), 1-10. doi:10.1002/jocb.397

Appendix A

Informed consent

Title The effect of forecasting on people's implicit evaluation process

By means of this form, I would like to inform you about the goal of this research, and the outlines of the experiment. The consent is applicable to the full duration of the study.

Aim of study To successfully implement creative ideas into practice, the best idea resulting from idea generation should be recognized and selected. Although more attention has been directed to idea evaluation as part of creative thought, there is still little known about this evaluation phase, despite its crucial importance. Therefore, this study tries to expand the research field of idea evaluation by investigating people's implicit evaluation process regarding ideas' originality and practicality. All data conducted during this experiment will only be used for research purposes.

Duration experiment This experiment will take approximately half an hour. During this time, you will be filling in questionnaires containing demographic questions and questions about your personality traits. Additionally, you will be asked to fill in tests to determine your attitude toward ideas' originality and practicality. Finally, you will be asked to evaluate an idea by making use of forecasting. If you signed up via the *Participant Pool*, you will receive 0.5 *Participant Pool* credits for your participation. You will receive these credits when you have finished the experiment.

Privacy and confidentiality All collected data will be handled with care. Your name will not be connected to any of your data. At the beginning of the experiment, you will get a personal ID number, which will be used to connect your data. Therefore, neither your name, nor you email address will be saved or used as reference for your data. The personal ID number will be used to connect your data collected with the questionnaires, tests, and evaluation assignment. These personal data will be saved anonymously.

During the research, the data will be initially saved online. These data could only be accessed by the researcher's personal account protected with a password. At the end of each experimental day, the gathered data will be downloaded to the researcher's personal computer which is again protected with a password. The informed consent form will be saved in a locked locker. Only the researchers have access to the data. After the research, the data will be transported to a protected and locked location (Dataverse) of Tilburg University. In agreement with the policy of Tilburg University, the anonymous data will be saved for ten years on this protected server. Only qualified researchers have access to these data.

The data gathered by all participants will be viewed as a whole. Your data will not be analyzed individually. Therefore, your data cannot be traced back to you personally. Besides, you could decide to quit the experiment at all times, even when the experiment has already started without given an explanation for this. This study is examined and approved by the Research Ethics and Data Management Committee of Tilburg School for Humanities and Digital Sciences.

Voluntary participation You are not obligated to participate in this study. If you agree on participating in this study, you can still decide to quit the experiment at all times. You do not have to give an explanation, and quitting the experiment will not have negative consequences for you. Additionally, you are not obligated to answers questions you do not want to answer.

Contact If you have questions after finishing the experiment, you could always contact Alwin de Rooij, the responsible researcher for this study.

Permission

I have had the opportunity to read this statement, and I am informed about the study. I was able to ask questions about the study, and my questions are answered. I am willing to participate in this study, and I give approval that my data can be used for analyses, and will be saved for ten years. Additionally, I give permission for potential reuse of my anonymous data for other research purposes about creativity, of which possibly a research paper might be published.

Signature participant	Date
Name participant	
Signature researcher	Date
Name researcher	

Appendix B

Debriefing

Debriefing

You have ended the experiment. Thank you for your participation. You will receive 0,5 Participant Pool course credits. As mentioned before, your data will be handled with care, anonymously, and confidentially. The data will only be used for research purposes.

The goal of this research was to investigate whether extended forecasts can serve as an uncertainty reduction strategy in order to reduce individuals' implicit bias against originality. A lower implicit bias against originality should individuals make more open for originality, and therefore value creative ideas more. If after hearing this explanation, you would not want us to include your data in the analyses, let it know, and your data will be removed from the study.

Additionally, I would like to ask you not to talk about this study with other potential participations until June 14, 2019. If you are interested in the results from this study, you can leave your name and email address with the researcher, and you will receive the results when the study has finished. If you have questions about this study, you can contact Alwin de Rooij or Lotte Bruijninckx .
Once again, thank you for your participation!

Permission

I have had the opportunity to read this statement, and I am informed about the study. I was able to ask questions about the study, and my questions are answered. I am willing to participate in this study, and I give approval that my data can be used for analyses, and will be saved for ten years. Additionally, I give permission for potential reuse of my anonymous data for other research purposes about creativity, of which possibly a research paper might be published.

Signature participant	Date

Name participant

Appendix C

First survey in Qualtrics

This experiment is conducted by a student of Tilburg University, and is part of a master thesis as the last part of the study MSc New Media Design. This experiment tries to examine individuals' implicit idea evaluation process.

This experiment will take approximately half an hour. During this time, you will be filling in questionnaires containing demographic questions and questions about your personality traits. Additionally, you will be asked to fill in tests to determine your attitude toward ideas' originality and practicality. Finally, you will be asked to evaluate an idea by making use of forecasting. If you signed up via the *Human Subjects Pool,* you will receive 0.5 Human Subjects Pool credits for your participation. You will receive these credits when you have finished the experiment.

The experiment will take about half an hour. All collected data will be handled with care. The data will be saved anonymously. If you click on the 'continue button', the experiment will start. If you decide to no longer continue the experiment, you can quit whenever you want without giving an explanation for this.

Thank you for your participation,
Lotte Bruijninckx

1. What is your participant ID?

---

2. What is your age?

---

3. What is your gender?

- ○ Male
- ○ Female
- ○ I would rather not say

4. Do you have experience product development?

- ○ Yes
- ○ No

5. What do you study?

_____

6. How do you indicate your English skills?

- ○ Very poor
- ○ Poor
- ○ Acceptable
- ○ Good
- ○ Very good

7. To what extent do the following statements apply to you?

	Not at all characteristic of me				Entirely characteristic of me
Uncertainty stops me from having a strong opinion	○	○	○	○	○
Being uncertain means that a person is disorganized	○	○	○	○	○
Uncertainty makes life intolerable	○	○	○	○	○
It is unfair having no guarantees in life	○	○	○	○	○
My mind cannot be relaxed if I do not know what will happen tomorrow	○	○	○	○	○

Uncertainty makes me uneasy, anxious, or stressed	○	○	○	○	○
Unforeseen events upset me greatly	○	○	○	○	○
It frustrates me not having all the information I need	○	○	○	○	○
Uncertainty keeps me from living a full life	○	○	○	○	○
One should always look ahead so as to avoid surprises	○	○	○	○	○
A small unforeseen event can spoil everything, even with the best planning	○	○	○	○	○
When it is time to act, uncertainty paralyses me	○	○	○	○	○
Being uncertain means that I am not first rate	○	○	○	○	○
When I am uncertain, I cannot function very well	○	○	○	○	○
Unlike me, others seem to know where they are going with their lives	○	○	○	○	○
Uncertainty makes me vulnerable, unhappy, or sad	○	○	○	○	○
I always want to know what the future has in store for me	○	○	○	○	○
I cannot stand being taken by surprise	○	○	○	○	○
The smallest doubt can stop me from acting	○	○	○	○	○
I should be able to organize everything in advance	○	○	○	○	○
Being uncertain means that I lack confidence	○	○	○	○	○
I think it is unfair that other people seem to be sure about their future	○	○	○	○	○
Uncertainty keeps me from sleeping soundly	○	○	○	○	○
I must get away from all uncertain situations.	○	○	○	○	○
The ambiguities in life stress me	○	○	○	○	○
I cannot stand being undecided about my future	○	○	○	○	○

8. In the following exercise, words will appear in the middle of the screen. Place your left and right fingers on the **E** and **I** keys on your keyboard. At the top of the screen, there will be two categories. When the word in the middle of the screen belongs to the category on the left, press the **E** key as fast as you can. When the word belongs to the category on the right, press the **I** key as fast as you can. If you make an error, a red cross will appear. You can correct errors by hitting the other key.

9. To what extent do you consider the following aspects important in an idea?

	Strongly negative	Negative	Slightly negative	Neutral	Slightly positive	Positive	Strongly positive
Creative	○	○	○	○	○	○	○
Practical	○	○	○	○	○	○	○
Inventive	○	○	○	○	○	○	○
Functional	○	○	○	○	○	○	○
Original	○	○	○	○	○	○	○
Constructive	○	○	○	○	○	○	○
Novel	○	○	○	○	○	○	○
Useful	○	○	○	○	○	○	○

Appendix D

Second survey in Qualtrics

You have reached the third part of this experiment. If you are ready, you can start this last part of the experiment by clicking on the 'continue button'.

1. What is your participant ID?

---

2. In the following exercise, words will appear in the middle of the screen. Place your left and right fingers on the **E** and **I** keys on your keyboard. At the top of the screen, there will be two categories. When the word in the middle of the screen belongs to the category on the left, press the **E** key as fast as you can. When the word belongs to the category on the right, press the **I** key as fast as you can. If you make an error, a red cross will appear. You can correct errors by hitting the other key.

3. To what extent do you consider the following aspects important in an idea?

	Strongly negative	Negative	Slightly negative	Neutral	Slightly positive	Positive	Strongly positive
Useful	○	○	○	○	○	○	○
Novel	○	○	○	○	○	○	○
Constructive	○	○	○	○	○	○	○
Original	○	○	○	○	○	○	○
Functional	○	○	○	○	○	○	○
Inventive	○	○	○	○	○	○	○
Practical	○	○	○	○	○	○	○
Creative	○	○	○	○	○	○	○

4. Earlier, you were presented with the idea of a new running shoe that adjusts fabric thickness to cool the foot and reduce blisters. Rate the idea on the following aspects.

	Strongly negative	Negative	Slightly negative	Neutral	Slightly positive	Positive	Strongly positive
Creative	○	○	○	○	○	○	○
Practical	○	○	○	○	○	○	○
Inventive	○	○	○	○	○	○	○
Functional	○	○	○	○	○	○	○
Original	○	○	○	○	○	○	○
Constructive	○	○	○	○	○	○	○
Novel	○	○	○	○	○	○	○
Useful	○	○	○	○	○	○	○

5. Indicate the extent to which the following statements apply to you. The statements are concerned with the idea of the new running shoe that adjusts fabric thickness to cool the feet and reduce blisters.

	Strongly negative	Negative	Slightly negative	Neutral	Slightly positive	Positive	Strongly positive
I'm uncertain about whether this idea will be successful	○	○	○	○	○	○	○
I'm uncertain about whether this idea will fail	○	○	○	○	○	○	○
I feel uncertain about this idea	○	○	○	○	○	○	○

6. During the experiment, did you face difficulties with the English language?

- Not at all
- Very little
- Somewhat
- To a great extent

7. You have ended the experiment. Thank you for your participation. You will receive 0.5 Human Subjects Pool course credits if you signed up via the Human Subjects Pool. As mentioned before, you data will be handled with care, anonymously, and confidentially. The data will be used for research purposes.

The goal of this research was to investigate whether extended forecasts can serve as an uncertainty reduction strategy in order to reduce individuals' implicit bias against originality. A lower implicit bias against originality should individuals make more open for originality, and therefore value creative ideas more. If after hearing this explanation, you would not want us to include you data in the analyses, let me know, and your data will be removed from the study.

Additionally, I would like to ask you not to talk about this study with other potential participants until June 14, 2019. If you are interested in the results from this study, you can leave your name and email address with the researcher, and you will receive the results when the study has finished. If you have questions about this study, you can contact Alwin de Rooij or Lotte Bruijninckx

Once again, thank you for your participation!

Appendix E

Example screens of the Implicit Association Test

Figures 1 till 4 show example screens of the Implicit Association Test. All four categories were part of the test. Whether creativity or practicality/good or bad was placed on the left or right upper corner was randomized. Participants had to assess the word in the middle till the correct corner by pressing 'E' for the left upper corner and 'I' for the right upper corner.

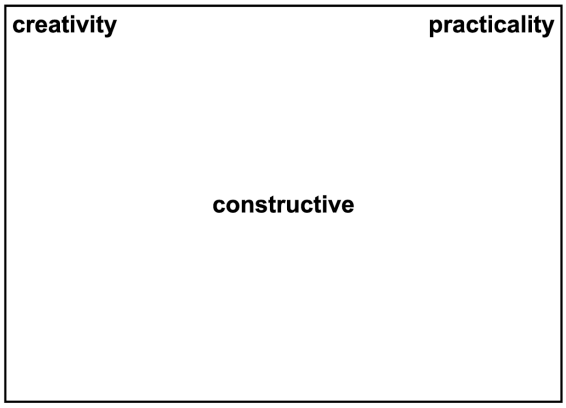


Figure 1 Two attitude objects (i.e., creativity and practicality)

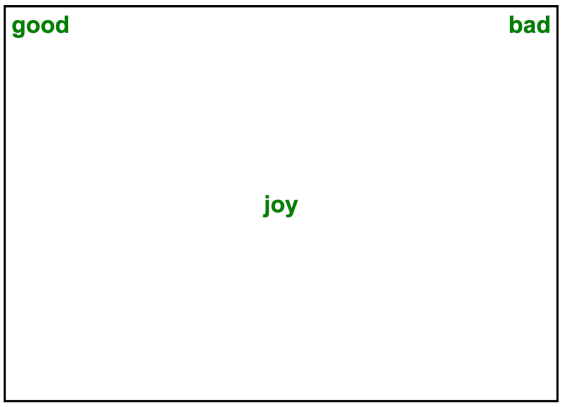


Figure 2 Two evaluative dimensions (i.e., good and bad)

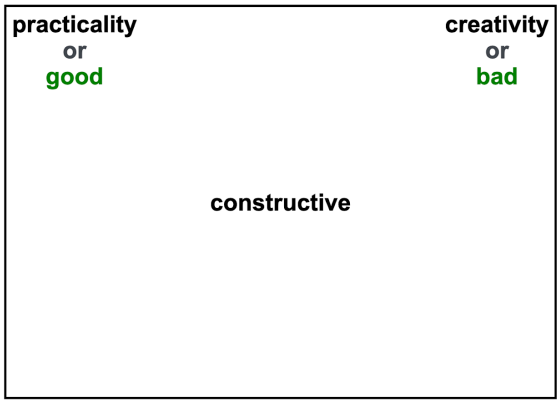


Figure 3 Practicality combined with good, creativity combined with bad

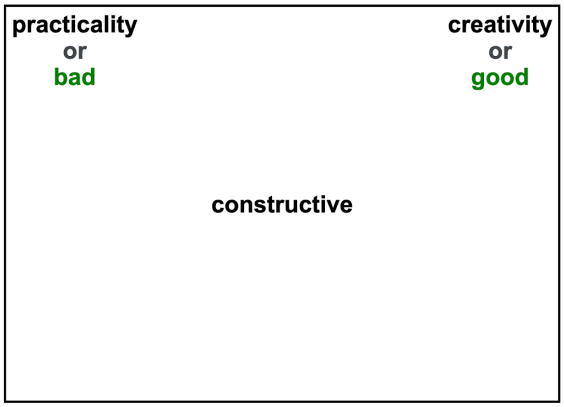


Figure 4 Practicality combined with bad, creativity combined with good

Appendix F

Interreliability scores

		Rater A (researcher)					
		no discussion	some discussion	moderate discussion	fair amount of discussion	extensive discussion	total
Rater B (external judge)	no discussion	23	2	0	0	0	25
	some discussion	0	15	3	0	0	18
	moderate discussion	0	0	8	2	0	10
	fair amount of discussion	0	0	0	1	1	2
	extensive discussion	0	0	0	0	5	5
	total	23	17	11	3	6	60

Appendix G

Benchmark rating scales for extensive forecasting

Solution contribution

Definition: The extent to which the participant discusses the contribution of the solution presented in the email to the problem.

Rating scale:

1. No discussion within the forecast on solution contribution.
2. Some discussion within the forecast on solution contribution. Participant minimally considers the contribution of the solution to a problem, but is not specific.
3. Moderate discussion within the forecast on solution contribution. Participant considers the contribution of the solution to the problem, but does not consider the impact on certain actions.
4. Fair amount of discussion within the forecast on solution contribution. Forecast is largely focused around this consideration. Participant describes in some detail how the solution can contribute to the problem.
5. Extensive and explicit discussion within the forecast on solution contribution. This consideration is discussed in depth and is a major focus within the forecast.

Additional benefits

Definition: The extent to which the participant discusses additional benefits of the solution that do not directly contribute to the original problem.

Rating scale:

1. No discussion within the forecast on additional benefits.
2. Some discussion within the forecast on additional benefits. Participant minimally considers additional benefits of the solution, but is not specific.
3. Moderate discussion within the forecast on additional benefits. Participant considers additional benefits, and includes a follow up consequence of a certain benefit.
4. Fair amount of discussion within the forecast on additional benefits. Forecast in largely focused around additional benefits. Participant describes in some detail how the additional benefits have an added value, and includes sequential follow up consequences of a certain benefit.
5. Extensive and explicit discussion within the forecast on additional benefits. This consideration is discussed in depth and is a major focus within the forecast. Additional benefits are explained by sequential follow up consequences.

Specificity of outcomes

Definition: The extent to which the participant discusses potential outcomes in detail.

Rating scale:

1. No discussion within forecast on the specificity (e.g., direction, consequence) of an outcome.
2. Some discussion within the forecast on the specificity of an outcome. Participant minimally considers the specificity (e.g., direction, consequence) of an outcome.
3. Moderate discussion within the forecast on the specificity (e.g., direction, consequence) of an outcome. Participant considers the direction or consequences of an outcome, and includes the impact of this.
4. Fair amount of discussion within the forecast on the specificity (e.g., direction, consequence) of an outcome. Forecast in largely focused around the direction or consequences of potential outcomes. Participant describes in some detail how the potential outcomes will work out, and includes sequential follow up consequences.
5. Extensive and explicit discussion within the forecast on the specificity (e.g., direction, consequence) of an outcome. This consideration is discussed in depth and is a major focus within the forecast. The direction and consequences of potential outcomes are explained by multiple follow up consequences

.

Uniqueness

Definition: The number of unique outcomes which the participant discusses. An outcome is considered as unique when it is written down only one time.

Calculation: The minimum amount of unique outcomes was zero, whereas the maximum amount of unique outcomes was four. The difference of five was equally divided over the five rating points.

Rating scale:

1. Zero unique outcomes.
2. One unique outcome.
3. Two unique outcomes.
4. Three unique outcomes.
5. Four or more unique outcomes.

Number of outcomes

Definition: The number of outcomes which the participant discusses. There was no distinction made between positive, negative, or additional outcomes.

Calculation: The minimum number of outcomes was zero, whereas the maximum number of outcomes was twelve. The difference of thirteen was equally divided over the five rating points.

Rating scale:

1. Zero or one outcomes.
2. Two or three outcomes.
3. Four or five outcomes.
4. Six or seven outcomes.
5. Eight or more outcomes.