Eye of the beholder: The effects of creativity and sensitivity on colour perception

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ABSTRACT

A definitive description of creativity is harder to come by. Creativity is a trait that appears to be under-represented in research and one that has links to other traits such as sensitivity. To measure creativity Remote Associates Test is often used. For sensitivity, Highly Sensitive Persons has been developed as a measure. This research set out to examine if there is a correlation for individuals with these traits finding employment in creative fields.

To examine if individuals in the creative arts have a more accurate perception of their environment, the Remote Associates Test and Highly Sensitive Person were used. It was hypothesized that there would be a significant correlation between creativity and sensitivity and that individuals involved in creative fields would have a more accurate perception of their environment. Results are discussed in relation to previous research.
INTRODUCTION

Creativity

Albert Einstein is credited with saying that “creativity is intelligence having fun”, and it would seem to provide an interesting insight into the use of the word. Creativity is a nebulous concept and one that can be approached in different ways. There is an element of knowledge and skill acquisition required before it is possible to create anything significant, but this can come from study, practice or an individual’s experience (Kaufman, Baer, & Skidmore, 2013, p. 71). Therefore, creativity could be seen as an application of a learned skill and the perseverance in applying it. But is this sufficient, or as Winner and Drake argue, is there an innate talent that spurs this application (2013, p. 334)?

It is clear that this is not a comprehensive or definitive description of the concept and would appear that this ability is not something that can be quantified. In comparison to the volume of studies other areas of research, a low volume investigate creativity. This was evidenced by the analysis of indexed articles in Psychological Abstracts between 1975 and 1994, which resulted in a .005% result for articles on creativity (Sternberg, Kaufman, & Pretz, 2002, p. 3). A related individual difference construct, intelligence, has received much more extensive academic attention (Batey, Furnham, & Safullina, 2010, p. 532) and therefore a much higher volume of studies.

Instead, creativity is a concept that has been the focus of various strands of research. Part of the outcome of that research, is that it is hard to give a definitive description for the concept and the lack of a clear and established definition for creativity inhibits efforts to
accurately measure the concept (Batey, 2012, p. 55). Part of the difficulty is also that the concept of a creative person tends to be linked to exceptional individuals of peak creativity such as Michelangelo or Einstein, which could lead to the assumption that it would be difficult to get a creative individual to study in a laboratory environment (Sternberg, Kaufman, & Pretz, 2002, p. 101). The belief that creativity is restrained to a very limited pool may not only hamper studies, but also limit the perceived utility. In addition, the perception of a creative work can change. While some highly creative individuals, such as Rubens (1577 – 1640), are recognised in their lifetime, other creative individuals such as Van Gogh (1853 – 1890) only receive acknowledgement of their ability posthumously.

If creativity can be seen as a complex interaction between an individual and their environment (Sung & Choi, 2009, p. 942) or the action that distinguishes an innovation from a more standard approach and the ability to solve problems during the innovation process (Ford, 1996, pp. 1112, 1113) it would open the potential applications of the ability. Contributing to the difficulty of defining creativity is the fact that the way that creativity can be exhibited varies (Houtz, et al., 2003, p. 322). The awareness that different cognitive styles reflect creativeness is becoming more acceptable. One area of research that explores creativity is management. Based on the eight categories of creative contributions set forward by Sternberg, Kaufman and Pretz (2002) proposes that the propulsions provided by creativity is similar to the propulsions provided by leadership (2002, p. 121).

Eysenck’s theory viewed creativity, as the possession of certain characteristics that are designed to promote creativity (Carlson, Martin, & Buskist, 2004, p. 459). This would seem to reduce creativity to a result of traits rather than a trait in and of itself. Creativity has
also been positively linked to other traits, such as neuroticism, extraversion and openness (Feist, 1998, p. 298). This would mean that there is also the potential to link creativity with other traits, such as sensitivity. Correspondingly, there is additional evidence to suggest that there is also an element of complexity of traits (Haller & Courvoisier, 2010, p. 156). Therefore, understanding creativity may also require greater understanding of correlated traits that exist in tandem.

Kirton developed Kirton Adaptation Innovation system developed from the premise that adaption and innovation are basic dimensions of personality and can be located on a continuum (1976, p. 622). To measure this, a 32 item self-report questionnaire was created (1976, p. 628). Kirton also noted the links between creativity and innovation (p. 623) and creativity is “usually viewed as the first step or ingredient for innovation” (Madjar, Greenberg, & Chen, 2011, p. 731). The Kirton Adaptation Innovation measure has been extensively used as a measure of creativity in various studies (Chávez-Eakle, Eakle, & Cruz-Fuentes, 2012; Madjar, Greenberg, & Chen, 2011; Isaksen, Lauer, & Wilson, 2003; Houtz, Selby, Esquivel, Okoye, Peters, & Treffinger, 2003).

Despite the ability to measure creativity, the focus of the Kirton Adaptation Innovation measure is not of the creative ability itself, but how it applies in the restricted focus of innovation and adaptation. It has been used to evaluate differences in what way people are creative and levels of creativity, but only by measuring the preferred styles of problem solving (Chávez-Eakle, Eakle, & Cruz-Fuentes, 2012, p. 77), if it is ‘do things better’ as opposed to ‘do things differently’ (Stum, 2009, p. 66). For this reason, it is very popular in business related studies, as it provides tools with which to index the creativity or
problem-solving tendencies of individuals (Stum, 2009, p. 67) and can be of assistance to managers who are required to deal with wide variety of cognitive styles and organizations undergoing a need for change (2009, p. 75). One of the main drawbacks to the Kirton Adaptation Innovation is that only certified practitioners are permitted to use the measure (KAI Centre, 2014). This restriction would make it unsuitable for the current study.

Mednick (1962, p. 227) created the Remote Associates Test after defining creativity as an ability to form “associative elements into new combinations which either meet specified requirements or are in some way useful” (Mednick, 1962, p. 221) which would also appear to cater to the more recent definitions of the concept. Therefore the Remote Associates Test provides the capacity to group individuals into higher and lower creativity groups. One of the most highly regarded measures of creativity is the Torrance Test of Creativity and Thinking (Chamorro-Premuzic, 2011, p. 321). This uses a range of picture and word based exercises that areas used to assess fluency, originality, elaboration and flexibility (Kim, 2006, pp. 3-4). It also has the benefit of approaching creativity as a multi-dimensional trait (Kim, 2006, p. 460). The main limitations for use in relation to the current study would be the subjectivity of the answers and the high level of participation engagement.

**Sensitivity**

Trait theories are based on the understanding that defining traits are a consistent pattern in how individuals behave, how they feel and how they think (Brunas-Wagstaff, 1998, p. 30). A trait is “an internal psychological disposition that remains largely unchanged throughout the lifespan and determines differences between individuals” (Chamorro-
Traits are regarded as being aspects of the personality that are enduring, but also typical and public. It is also noted that traits are not always expressed in behaviour.

Jung proposed the conclusion that there are two major attitude types, introversion and extroversion (Friedman & Schustack, 1999, p. 114). According to this interpretation, the “introvert’s main interests are in the inner world of concepts and ideas, while the extravert is more involved with the outer world of people and things” (Myers & Myers, 1995, p. 7). In addition, four different ways of relating to the world were classified: sensing, thinking, feeling and intuition (Maltby, Day, & Macaskill, 2013, p. 54). By using the Myers Briggs Type Indicator, an individual’s preferred perceptive process is identified and sorted into one of sixteen types (Maltby, Day, & Macaskill, 2013) (Myers & Myers, 1995, p. 14).

The Myers Briggs Type Indicator is based on Jungian principals interpreted in ordered to assist individuals to make use of the set of their own unique gifts (Myers & Myers, 1995, p. xii). This system regards introversion on a scale of preference, that each individual has both introverted and extraverted tendencies (Ryckman, 2008, p. 89). It identifies extraverts as more common than introverts, to the ratio of three to one (1995, p. 54), and regards this as an integral element of the personality. The Myers Briggs Type Indicator consists of 166 items in a forced test format (Ryckman, 2008, p. 94), which provides a detailed overview of the personality type and does not isolate the traits of introversion/extraversion. However, as the Myers Briggs Type Indicator is a diagnostic tool it would be unsuitable for this study. Jung’s use of extroversion and introversion differed slightly from later trait theories. By
regarding extroversion and introversion as elements that can be present in an individual, one or other of the traits could be dominant (Friedman & Schustack, 1999, p. 252).

However, the use of the terms extroversion and introversion have altered slightly since put forward by Jung. Cattell distinguished between surface traits and source traits, relying on the idea that hierarchical relations exist among trait concepts (Cervone & Pervin, 2008, p. 249). Cattell identified 16 source traits that could be identified using the Sixteen Personality Factors Questionnaire (16PF) (Friedman & Schustack, 1999, p. 255), which were further clarified into 3 categories. These categories were: ability traits temperament traits and dynamic traits (Cervone & Pervin, 2008, p. 250). As part of the personality factors, Cattell identified exvia-vs-invia to categorise outgoing and reserved traits (Feshbach & Weiner, 1991, p. 376; Chamorro-Premuzic, 2011, p. 52). Eysenck regarded behaviour hierarchically, in a similar way to Cattell. However, Eysenck identified three dimensions, neuroticism, extroversion-introversion, and psychoticism (Feshbach & Weiner, 1991, p. 367).

Eysenck also posited that there was a biological basis for personality. In particular, he focused physiological differences in the reticulo-cortical system (Chamorro-Premuzic, 2011, p. 46). Eysenck believed that introverts would have a greater tendency to be cortically aroused than extroverts who would then need to compensate for the lower cortical arousal by seeking external stimulation (Friedman & Schustack, 1999, p. 153). Due to the rapid advancement of technology available to investigate neuropsychology, several of the underlying concepts of Eysenck theory are outdated (Chamorro-Premuzic, 2011, p. 48). However, this improved technology has also been used to study correlation between the traits of extroversion and neuroticism and underlying biological mechanisms (Canli, 2004, p.
While correlations have been found, it is unclear at this point what the causes are (Canli, Zhao, Desmond, Kang, Gross, & Gabrieli, 2001, p. 38). This suggests that there is some basis for suggesting that there is an association with activity in certain cerebral regions with personality traits, but has yet to be finalised.

Since the 1960’s the focus has been on the most common trait approaches (Friedman & Schustack, 1999, p. 261). From this the Big 5: Extroversion, Agreeableness, Conscientiousness, Neuroticism and Openness have been developed (Friedman & Schustack, 1999, p. 257). This has been extensively used in order to classify extraverts and introverts for the purpose of research (Canli, 2004, p. 1110; Sung & Choi, 2009, p. 948; Haller & Courvoisier, 2010, p. 151). In particular, the category ‘Openness’ tends to be associated with intellectual curiosity, unconventional attitude and aesthetic sensitivity, but it is not restricted to creativity (Chamorro-Premuzic, 2011, p. 55). While this measure has many strong aspects, it is not specifically aimed at measuring creativity.

While Mednick focused on the process of creativity, and sought to define the process, Aron examined the individual. Sensory Processing Sensitivity (SPS) as a temperament or personality trait was defined by Aron and Aron as a “greater sensory processing sensitivity and depth of discrimination in a large minority of individuals” (1997, p. 350). By describing sensitivity as a “more careful processing of information” (Aron E., 2003, p. 7), the focus is on the individual’s own experience and therefore how that effects their ability to perceive the world. It would also appear that SPS is not only related behaviourally to traits such as introversion and shyness, but also seems to be innate (Aron, Ketay, Hedden, Aron, Markus,
Similar traits had been previously identified, but termed differently, such as ‘inhibitedness’ (Kagan, Reznick, & Snidman, 1987, p. 1460).

In addition to a personality trait, there would appear to be additional physiological and physiological related performance differences that are related to the sensory processing sensitivity (Aron & Aron, 1997, p. 345). Prior research had also indicated that there were similar tendencies in differences between children grouped into inhibited and uninhibited categories (Kagan J., 1994). Eysneck sought to define the trait with his theory of introversion in terms of arousal level (as cited in Aron & Aron, 1997, p. 346).

To measure this, the Highly Sensitive Person scale was developed (1997, pp. 352-353). During the development of this scale, it was noted that there appeared to be strong inter-correlations with self-reported sensitivities that included strong sensory input, the arts and sensitivity to subtleties (1997, p. 362). Potentially, this sensitivity to subtleties described in the self-reports could be consistent with categorical perception. However, this does not seem to have been followed up with measurable studies. Links between sensitivity, as categorised by Highly Sensitive Person, and creativity have also been proposed (Cain, 2012, p. 74; Aron E., 2003), however this does not seem to have been a subject of research to date.

There is evidence that links Highly Sensitive Person to greater activation in the right claustrum and other areas of the brain involved in high-order visual processing during a change detection task (Jagiellowicz, et al.). In that study, the Highly Sensitive Person measure was used to group individuals based on their scores as either high or low. The study
suggested replication in order to examine generalizability of the results, however the equipment required would be prohibitive.

A study has examined the relationship between the influences of cultural context on sensitivity and found that there is suggestive evidence that individuals scoring highly on sensitivity are less likely to exhibit cultural differences on a perceptual processing task (Aron, Ketay, Hedden, Aron, Markus, & Gabrieli, 2010, p. 224). This would be consistent with the suggestion that being highly sensitive impacts on how the individual interacts with their environment. The effects of cultural differences have also been found to have an impact on an individual’s interaction on the environment through colour perception tasks, as discussed below.

**Categorical Perception**

Categorical Perception “occurs when the continuous, variable, and confusable stimulation that reaches the sense organs is sorted out by the mind into discrete, distinct categories whose members somehow come to resemble one another more than they resemble members of other categories” (Harnad, 1990, p. ix). Different stimuli have been explored for categorical perception, from natural visual continua to auditory continua (Hanley & Roberson, 2011, p. 355). The drive to organise stimuli into categories seems to be innate, with infants as young as four months not only perceive hues and also categorise them in a similar way to adults (Bornstein, Kessen, & Weiskopf, 1976, p. 127). In the daily use of visual perception and processing environmental information, the natural shift in colours of objects of varying closeness is seen as being a component part of identifying where an object
is located (Solso, 2003, p. 213), therefore categorical perception is an integral part of interacting with the environment.

Perceiving the difference between colours has been seen as highly subjective. It is also seen as being an integral part of expression through creative visual media. Haines expressed it by saying “I cannot imagine a world without colour…How we see colour and how we paint it is a wonderful part of being an artist” (2010, p. 16). The phrase “colour transmits and translates emotion” has been attributed to the artist Kandinsky reflecting how this particular visual stimuli can be used to express more than the concrete fact of the colour. Despite this, colour can also be quantified into set categories, such as the Munsell colour system (Munsell, 1912, p. 241). This quantified system allows categorical perception to be documented and the results to be compared against a standardised measure. The two-alternative forced choice procedure as a way to establish category perception has been well established (Hanley & Roberson, 2011, p. 355).

The relationship between perceived brightness and colour can also be considered. Saturated shades of blue, red or violet appear to be less bright then yellow or green despite having an equal physical intensity (Solso, 2003, p. 101). As there are in the region of two million just noticeable differences in the range of colours that are visible to humans, colour categorisation is an area that has been well researched (Roberson D., 2009, p. 168). The ability to categorise would appear to be a highly automated process, to the point that participants are unable to communicate exactly why cross-boundary pairs of colour sample stimuli look different (Roberson D., 2009, p. 178). Categorising more than one stimuli can also contribute to difficulty in accurately categorising a hue. Perceptual distortions appear to
take place when the sample shape categories are also altered (Goldstone, 1995, p. 301). In order to avoid confounding results, standardised shapes for the colour samples in a two-alternative forced choice procedure should be used.

Based on the research by Roberson (2000) which explored the links between language and colour categorisation, it would appear that participants find it easier to distinguish between groups of colour rather than shades within groups of colour. It has also been noted that differences between reds and between yellows are perceived as being smaller than equal-sized differences that instead bridge the red/yellow boundary (Harnad, 1990, p. 535). In addition, performance has been found to be significantly faster and also more accurate when both the target sample and the distractor example are members of different categories despite the physical separation of the pairs being equated (Hanley & Roberson, 2011, p. 355).

The studies noted above have explored the individuals’ interaction with their environment by measuring their accuracy in the colour perception task. Categorical perception discrimination can also be effected when option given is within category boundaries as opposed to between category boundaries (eg blue vs red or blue vs aquamarine) (Regier & Kay, 2009, p. 7). A quantitative discontinuity in discrimination also exists at category boundaries of the selected stimuli (Harnad, 1990, p. 3). There is also evidence to suggest that the ability to differentiate different hues and shades of colour developed in order to allow a competitive advantage in interpreting nature’s warning colours (King, 2005, p. 6). These studies take into account both linguistic difference and also biological effects, however they do not appear to establish if there are more individual factors which may affect the perception task.
Studying children’s reaction to category perception has provided evidence suggesting that the number of children who can be classified into a group having a reverse boundary because their name boundary (in this case green and blue, and purple and blue) had not been aligned to match their adult counterparts (Goldstein, Davidoff, & Roberson, 2008, p. 234). As noted above infants appear to start categorising visual stimuli, this would imply that there are external influences on categorical perception. There is evidence that suggests that colour can be interpreted differently due to cultural and linguistic differences as examined by Roberson, Davies and Davidoff (2000). This data has also been interpreted to suggest that both “existence of universal constraints on colour naming and the influence of colour-naming difference on colour memory and discrimination” (Regier & Kay, 2009, p. 9).

**Current Study**

The purpose of the current study is to gain further understanding in regards to the traits of creativity and sensitivity. Creativity is a relatively under-investigated area, despite being linked to more popular areas of research such as intelligence (Chamorro-Premuzic, 2011, p. 303) and innovation (Ford, 1996, p. 1112). It retains a certain element of mystique, that even the untrained, or self-identified “uncreative” individual can identify it when they see it. One of the difficulties that it presents is that it appears to be difficult, if not impossible to define accurately (Batey, 2012, p. 56). As a concept, creativity could be perceived as an acquired skill or as an intrinsic trait (Kaufman, Baer, & Skidmore, 2013, p. 71).
Given this, it is understandable that the measures used to categorise creativity are relatively limited. While measures such as the Torrance Test of Creativity and Thinking would give a very detailed feedback, by their design, the responses required would be highly exhaustive. Categorising the responses on these measures is a relatively subjective process, which may reduce the usable data. In contrast, the Remote Associates Test requires more definitive responses and therefore is more quantifiable for the purposes of this study. In addition, it also lends itself to use through online formats which allow data to be collected with ease.

As discussed previously, sensitivity is currently defined using a self-report measure in order to define it. It has been linked to physical responses (Jagiellowicz, et al., 2011) and also seems to correlate to an extent with the traits of introversion or inhibitedness (Kagan, Reznick, & Snidman, 1987). It may be of note that as introversion tends to be associated with ‘negative’ emotions rather than the positive emotions of warmth, assertiveness, activity that are associated with extraversion (Chamorro-Premuzic, 2011, p. 55), there may be an element of social desirability that must be taken into account (Haller & Courvoisier, 2010, p. 157).

Does personal experience effect colour perception? This has been explored in relation to culture (Roberson, Davies, & Davidoff, 2000) (Goldstein, Davidoff, & Roberson, 2008), but does not appear to have been explored in relation to personal experience. As both the traits of creativity and sensitivity appear to have an effect on how an individual interacts with their environment, this suggests an area for this study to investigate. By identifying a difference, if any, in how the traits of creativity and sensitivity factor into this, the study
would aim to contribute towards the current bodies of research in the various areas. It potentially would provide further information on how to identify how highly sensitive individuals interact with their environment. This may be of assistance in creating a less stressful environment, or one that can be modified to provide less stimuli which has been identified as one issue that a highly sensitive individual may face (Aron & Aron, 1997, p. 365).

By using a structure similar to studies such as Roberson (2000; 2009), this study intends to assess if there is any correlation between these traits with the intention to contribute to the current bodies of research. Therefore, the hypothesis for the current study are as follows:

**Hypothesis 1:** That there will be a significant difference between individuals in the creative fields and those who are not, on the colour perception task.

**Hypothesis 2:** That there is a significant correlation between creativity and sensitivity, as defined by Remote Associates Test and Highly Sensitive Person.

**Hypothesis 3:** That individuals working in creative arts have more accurate perception.

**Hypothesis 4:** That individuals scoring highly on Highly Sensitive Person are more sensitive to environmental factors, so that there is correlation between sensitivity and colour perception.

**Hypothesis 5:** That there is multiple correlation between creativity, sensitivity and colour perception.

**Hypothesis 6:** That accuracy in the colour perception task will differ on the within and between colour boundaries.
METHOD:

The main materials used were presented in an online based task and questionnaire format. Overall, there were five elements for the participant to complete and they are detailed below.

Segment 1: Information page and consent form

The first page provided details of the project to allow the participant make an informed decision to take part in the study. These elements included an introduction to the researcher and a brief description of the project. It noted that the research would be used as part of an educational study and may later be used in academic presentations. In addition, it also advised the participant that by continuing with the survey, they were consenting to participate in the study. To proceed onto the questionnaire itself, the participant was asked to select “Yes” or “No” if they were willing to consent with this.

Segment 2: Demographic

The second page provided basic demographic information, including age, gender, nationality and involvement in either training or employment in the creative fields. While age was not being considered as a variable in any of the hypothesis, it was required to ensure that the participant was over 18 years of age, and therefore able to give informed consent. The information requested in relation to involvement in the creative field allows for groups to be established.

Segment 3: First questionnaire – Highly Sensitive Person

This segment used the Highly Sensitive Person (Aron & Aron, 1997). This is a self-administered measure, comprising of 27 questions requiring a positive or negative answer. Previous studies have shown Highly Sensitive Person to have an alpha of .85 or above (Aron & Aron, 1997, p. 360). The current study has a Cronbach’s alpha of 0.83.
**Segment 4: Colour Perception task**

The colour perception task was comprised of 36 pairs. The participant viewed the first sample before proceeding to the next page, where two more samples were presented. The participant was then requested to choose the match of the original sample from the two on the current page, as illustrated in Figure 1.

![Figure 1 – Flow chart of the colour perception task](image)

The structure for the task was adapted from the format used by Roberson and colleagues (2000), in which participants were shown physical colour samples. By transferring this task to an online medium, it allowed greater access and privacy in addition to less time pressure on the participant. This task was constructed specifically for this research project using the online survey provider Kwik Surveys. This provider was selected as it allowed an image to be included in the body of the survey format. This allowed each colour to be uploaded into the system from an independent source, enabling the colours to be pre-selected.

The Roberson study (2000) used colours selected from on Colour Aid card squares, as Colour Aid make use of the Munsell chart (see Figure 2) and focused on colour perception.
differences in between groups (i.e. light blue and dark blue) and cross boundaries (i.e. green and blue). An initial attempt at using the colours from the Munsell chip colour array for the present study was not successful. To identify three groups in both (near, medium and far) colour selections were taken from the different squares (e.g. A10 and A11). However, as the differences in all groups were too noticeable; this rendered even the ‘near’ groups as very identifiable. It would appear that displaying the images on the computer screen highlighted the differences in the colour chart and therefore would confound the colour perception task.

In order to create a usable colour perception task, an alternative had to be found. To ensure that the task would be replicable, the colours and process used would need to be easily accessible. Another consideration would be the control of the hue and shade of the individual colours. Therefore the programme MS Paint was selected as it a basic graphic utility and it is incorporated in all Microsoft Windows versions. In addition to being a very accessible system, it also allows for control and replication of individual shades.

The task was made of 36 pairs of colours. There were 6 sets of colours. These were achieved by dividing into 2 overall groups (within groups and without group).
were sub-divided into 3 sections (close, medium, far). Each colour comprises of a mix of Green, Red and Blue. To edit a colour in MS Paint, these three variables can be manipulated in the Edit Colours function. For this study, each sample was saved and then uploaded to Kwik Survey for the task. To allow for replication of each colour, the coding used is listed in appendix C – each code has been provided to allow the correct mix of colours (eg R0 G0 B160). This appendix also recorded the correct response. Once all samples had been saved onto Kwik Survey, they were formatted into the work flow as laid out in Figure 1. It should be noted that the colours are replicable on the screen, however a printed questionnaire may be confounded by printing error.

**Segment 5: Remote Associates Test**

The Remote Associates Test is a measure of creativity and was originally devised by Mednick (1962) and was later extended. In full format, it consists of 68 items (University of California Berkeley, 2011). Three words are presented, and the participant is requested to add a fourth word that links to the other three. For example, for the set “Time” “Hair” and “Stretch”, the linking word is “Long”. In full, the Remote Associates Test can take up to 40 minutes, it has the option to be timed or at the participant’s own pace. In the interests of reducing the time demand on the participant and in order to minimise any incomplete responses due to distraction or frustration, the list used was reduced to 24 (see appendix C for full list used in the project which starts with the easiest and continue in levels of difficulty). These were selected to give a variety of difficulty levels, which should result in a high level of correct responses suggesting a high level of creativity. Due to the online format used, no time factor was utilised. The current study has an Cronbach’s alpha of 0.88.
Participants

The total number of participants to this quasi-experimental study was 74 individuals responding to the questionnaire and task. The age range of participants was between 21 and 93 (mean = 40.97, SD = 12.75). Of the participants 77% were female (n= 57) and 23% were male (n= 17). All participants were presented with identical questionnaires and colour perception task.

Overall, the intention was to establish if there is a correlation between creativity and perception. In order to do so, two groups were needed. One group would be made up of participants who self-identified as working in the creative field to contrast the second group of individuals who self-identified as not involved in a creative field of study or occupation. In order to gain access to these groups of individuals, participants were drawn through a combination of initial convenience sampling followed by snowball sampling. In total,
individuals working in the creative field made up 68% (n = 50) and individuals working in non-creative fields made up 32% (n = 24) of the study.

In both categories, snowball sampling was used in order to gain access to potential participants, but was of particular use for the high-creative group. Participation was voluntary and there were no additional incentives given.

![Gender participation](image)

**Design**

This study was of a mixed design. The individual segments of the study allowed flexibility in approach. It made use of quantitative correlational questionnaire design in order to measure the level of sensitivity and creativity in respondents. In relation to the hypothesis, the predictor variables are
the trait creativity and the trait sensitivity as measured by Remote Associates Test and Highly
Sensitive Person respectively. The colour task acted as the criterion variable, as it provided three
levels of difference (near, close, far) on two different factors (within group and without group). The
accuracy of response in each was treated as repeated measures. The participants were assigned into
two groups, which contributed to the independent group design element. By establishing groups
through participants self-identifying as being occupied or trained in a creative field or not, there was
an independent group design element to this study. This allowed for a between group element of
design.

This study was of mixed design, as it contained elements of correlational, experimental and quasi-
experimental processes. By using the Highly Sensitive Person and Remote Associates Test
measures with the intention to explore if there was a relationship, there was a quasi-experimental
element. The experimental element was contained in the colour perception task, as the participants
received equal treatment in their access to the task.

**Apparatus**

The equipment required for this study consisted of

- Secure password protected laptop
- Microsoft Paint
- Access to Kwik Survey website and custom colour perception task (see appendix E for print
  version)
- Highly Sensitive Person (see appendix B)
- Remote Associations Test (see appendix C)

**Procedure**
The online questionnaire-style format provides anonymity to the participants, as it allows the participant to complete it at their own leisure and privacy. The first page of the questionnaire contains the consent form, and clearly advises that participation is voluntary and that the participant is under no obligation to take part. It also notes that once the questionnaire is completed, the responses cannot be isolated again as the responses are anonymous. A full copy of the form is enclosed (see appendix A). Access was provided by an online link. This allowed the participants to complete the individually, but in addition to forward the link onto acquaintances of their own choosing.
**RESULTS**

Table 1 reports descriptive statistics (M, SD) for all target measures.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
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<td>Sensitivity</td>
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<td>33.00</td>
<td>53.00</td>
<td>42.84</td>
<td>5.37</td>
</tr>
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<td>Total Colour Perception task</td>
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<td>48.00</td>
<td>60.00</td>
<td>54.00</td>
<td>2.50</td>
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<td>Creativity</td>
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<td>24.00</td>
<td>43.00</td>
<td>32.36</td>
<td>5.50</td>
</tr>
<tr>
<td>Total of within group (near)</td>
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<td>7.00</td>
<td>12.00</td>
<td>8.94</td>
<td>1.14</td>
</tr>
<tr>
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<td>1.14</td>
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<tr>
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<td>7.94</td>
<td>1.07</td>
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<tr>
<td>Total of without group (far)</td>
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<td>11.00</td>
<td>9.90</td>
<td>0.94</td>
</tr>
<tr>
<td>Total of within group (near and medium)</td>
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<td>22.00</td>
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<td>8.00</td>
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<td>2.00</td>
<td>1.32</td>
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</table>

*Figure 3 - Descriptive Statistics*
**Hypothesis 1:** That there will be a significant difference between individuals in the creative fields and those who are not on the colour perception task.

**Independent Samples Test**

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>Sig.</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
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</thead>
<tbody>
<tr>
<td>Total Colour Task</td>
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<td></td>
<td>-0.77</td>
<td>60.00</td>
<td>0.45</td>
<td>-0.53</td>
<td>0.69</td>
<td>-1.915 – 0.852</td>
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<td>0.43</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Equal variances not assumed</td>
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<td>44.36</td>
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<td>-0.53</td>
<td>0.62</td>
<td></td>
<td>-1.790 – 0.728</td>
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</tbody>
</table>

**Figure 4 - Independent samples t test for overall colour perception task**

An independent samples t-test found that there was no statistically significant difference between individuals involved in the creative field (M = 54.37, SD = 2.06) and individuals not involved in the creative field (M = 53.84, SD = 2.68) (t(60) = -0.77, p = .45, CI (95%) -1.915 – 0.852) on the perception task. Therefore the null must be accepted.
Hypothesis 2: That there is a significant correlation between creativity and sensitivity, as defined by Remote Associates Test and Highly Sensitive Person.

Correlations

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>Pearson Correlation</td>
<td>__</td>
</tr>
<tr>
<td>Creativity</td>
<td>Pearson Correlation</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Figure 5 - Correlation table for sensitivity and creativity

A Pearson correlation coefficient found that there was no significant relationship between sensitivity (M = 42.84, SD = 5.37) and creativity (M = 3.36, SD = 5.49) (r (55) = 0.08, p = 0.559). Therefore the null hypothesis must be accepted, as presented in Figure 6.
Figure 6 - Scatterplot of correlation between sensitivity and creativity
Hypothesis 3: That individuals working in creative arts have more accurate perception

An independent samples t-test found that there was no statistically significant difference between individuals involved in the creative field (M = 9.05, SD = 0.78) and individuals not involved in the creative field (M = 8.88, SD = 1.28) (t(60) = -0.53, p = .596, CI (95%) -0.80 – 0.47) on the within group close colour perception task. Therefore the null must be accepted.

In addition to this, an independent samples t-test found that there was no statistically significant difference between individuals involved in the creative field (M = 9.00, SD = 1.29) and individuals not involved in the creative field (M = 8.86, SD = 1.32) (t(60) = -0.39, p = .702, CI (95%) -0.86 – 0.58) on the without group close colour perception task. Therefore the null must be accepted.
Hypothesis 4: That individuals scoring highly on Highly Sensitive Person are more sensitive to environmental factors, so that there is a correlation between sensitivity and colour perception.

Correlations

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Total within group (near and medium)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td></td>
<td>Pearson Correlation: -0.04</td>
</tr>
<tr>
<td>Total within group (near and medium)</td>
<td></td>
<td>Pearson Correlation: 0.04</td>
</tr>
</tbody>
</table>

Figure 7 - Correlation table for sensitivity and colour perception

A pearson correlation coefficient found that there was no significant relationship between sensitivity (M = 42.84, SD = 5.37) and within group responses (M = 19.16, SD = 1.43) (r (59) = -0.04, p = 0.753). Therefore the null hypothesis cannot be rejected.
Figure 8 - Scatterplot of correlation between sensitivity and colour perception within group (near)
### Correlations

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Sensitivity Pearson Correlation</th>
<th>Total without group (near and medium) Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td></td>
<td>0.13</td>
</tr>
</tbody>
</table>

**Figure 9 - Correlation between Sensitivity and without group**

A Pearson correlation coefficient found that there was no significant relationship between sensitivity ($M = 42.84$, $SD = 5.37$) and within group responses ($M = 16.84$, $SD = 1.68$) ($r(59) = -0.13$, $p = 0.301$). Therefore the null hypothesis cannot be rejected.

**Figure 10 - Scatterplot of correlation between sensitivity and colour perception on without group (near)**
**Hypothesis 5:** That there is multiple correlation between creativity, sensitivity and colour perception.

**Correlations**

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Sensitivity</th>
<th>Creativity</th>
<th>Within group (near and medium)</th>
<th>Without group (near and medium)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>Pearson Correlation</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Creativity</td>
<td>Pearson Correlation</td>
<td>0.08</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Within group (near and medium)</td>
<td>Pearson Correlation</td>
<td>-0.04</td>
<td>0.16</td>
<td>—</td>
</tr>
<tr>
<td>Without group (near and medium)</td>
<td>Pearson Correlation</td>
<td>0.13</td>
<td>.27*</td>
<td>-0.02</td>
</tr>
</tbody>
</table>

* P< 0.05 level (2-tailed).

**Figure 11 - Correlations between Sensitivity, Creativity and Colour Perception**

A pearson correlation coefficient found that there was a weak positive significant relationship between creativity (M = 32.36, SD = 5.49) and within group close (M = 19.16, SD = 1.43) (r (59) = 0.27, p 0.30). Therefore the null hypothesis is rejected. This relationship can account for 7.29% of variation of scores.
**Hypothesis 6:** That accuracy in the colour perception task will differ on the within and between colour boundaries.

**Pairwise Comparisons**

<table>
<thead>
<tr>
<th>(I) distance</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1.161*</td>
<td>.155</td>
<td>.000</td>
<td>.780</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>.726*</td>
<td>.128</td>
<td>.000</td>
<td>.411</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>-1.161*</td>
<td>.155</td>
<td>.000</td>
<td>-1.542</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>-.435*</td>
<td>.157</td>
<td>.023</td>
<td>-.821</td>
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<tr>
<td>3</td>
<td>1</td>
<td>-.726*</td>
<td>.128</td>
<td>.000</td>
<td>-1.042</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>.435*</td>
<td>.157</td>
<td>.023</td>
<td>.048</td>
</tr>
</tbody>
</table>

Based on estimated marginal means

* The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

**Figure 12**

A repeated measures ANOVA, using the Greenhouse-Geisser correction, showed that the accuracy of those involved in the creative fields differed significantly between the three conditions ($F(2, 113) = 31.73, p < .00$) with an effect size of 0.346. This showed that 35% of the variation in accuracy can be attributed to the variety of difference between the groups close, medium and far. Pairwise comparisons highlighted that the within boundary made significantly more errors than the medium (mean difference = -0.73, $p = .000$, CI (95%) $-1.04$ - $-0.41$) and the medium (mean difference = 0.435, $p = .023$, CI (95%) $0.048$ – $0.821$).
within group (close) within group (medium) within group (far) without group (close) without group (medium) without group (far)

- in the creative field
- not in the creative field
DISCUSSION

The current study has suggested that there is a positive correlation between creativity and colour task perception. This would support the suggestion that there is a trait element that effects how individuals interact with their environment. While Aron and Aron (1997) have put forward that the trait sensitivity also has an impact on how an individual interacts with their environment, they also suggest that there is a link between sensitivity and creativity (Cain, 2012; Aron E., 2003). While no correlation was found in this study, it may remain a potential area for further research.

As mentioned above, the Remote Associates Test is only one method of measuring creativity. Alternatives had been considered for the current study, but due to limitations were not found suitable for this case. Despite the limitations of this current study, this should not deter further research. Therefore, there is the potential for further studies to use measures such as the Torrance Test of Creativity and Thinking. This measure in particular does result in a very rich result and would be of use in the event of a study with a broader scope of attention. The structure of the current study could be modified to allow various measures of creativity. This would in turn have a range of benefits. It would add to the literature in relation to creativity, which has been noted as being an under researched area of interest. If alternative measures of creativity, such as the Kirton Adaptation Innovation are used, this would also allow the further results to be compared to the current study and any following studies. Therefore, if the results correlate this would in turn build upon the current understanding and potentially further the attempts to better define the concept of creativity.
As noted above, there has been no correlation found between creativity and sensitivity. However, uses of alternative measures of creativity again may prove useful in providing a greater opportunity to find possible correlations. Again, limitations faced would include access to potential participants. In this study, snowball sampling was quite successful and has given a respectable response size. Further avenues that may be considered would be how this trait may be utilised with respect to colour perception, and other environmental interaction. As many of the alternative measures of creativity focus on business applications (e.g. Kirton Adaptation Innovation), this may result in a cross discipline area of study.

This study did find significant differences in relation to the colour perception task as noted above. This would build upon the previous research as it would support the results found by Roberson, Davies and Davidoff (2000) and Goldstein, Davidoff and Roberson, (2008). It has been noted that there is still research into the area of universal colour boundaries, as noted by Regier and Kay (2009, p. 9). Following on from these bodies of research, it may be of interest to further explore this in conjunction with a broader range of creative individuals.

This study found no significant differences between individuals involved in the creative field and those where were not. This would appear to be to be in contrast with existing studies. The Haller and Courvoisier study (2010, p. 156) suggested a link between personality traits and courses of study, by measuring personality traits of art students, music students and psychology students. This may suggest that there would be various personality traits attracted to various occupations.
Winner and Drake argue that individuals with creative talent are more likely to commit the hard work required to their area of creative interest, which in turn nurtures and develops the intrinsic talent (2013, p. 335). This intrinsic motivation stemming from the internal trait of creativity is argued to lead to creative solutions to challenges faced by the individual. This would appear to suggest that there is an underlying difference in the creative individual’s method of interacting with their environment. Therefore, this may suggest further avenues for further study in relation to the original hypothesis of this study.

One option would be to further refine the groups involved. Potentially, even within the creative fields, there is a wide range of variants in traits (Haller & Courvoisier, 2010, p. 154). To explore this aspect, a similar structure to the current study may be considered. The proposed study may require further details into the demographic section, creating sub groups within the creative field. Groups considered may be in the visual field (e.g. photographer, architect, painter), the musical field (e.g. composer, musician, singer) or the verbal field (e.g. journalist, novelist, poet). Again, the main limitation which would need to be addressed would be the access to the population of interest. While the current study utilised snowball sampling, further studies may consider purposeful sampling. However, this method may not be sufficient if subgroups of sufficient sizes are needed. Purposeful sampling then may consider focusing on photography clubs, painting groups or journalism courses.

Another limitation that may be addressed in this case may be those imposed by the limitations of the colour perception task. As this study was based on the format used in the
Roberson, Davies, and Davidoff study (2000) which presented a limited option response. To further explore the interaction with the environment, further studies may consider giving an additional answer option of “no visible difference”. The benefit would be to reduce the possibility of the participant guessing a response, but would have the limitation of giving the option to many opportunities to provide a non-productive response. In that case, a pilot study may be required to identify further weaknesses in order to further tighten the design.

The current study found no significant difference between individuals in the creative fields and those who are not in the creative group on either the within group colour perception task or the without group task. The present study was developed along similar lines to the Roberson, Davies, and Davidoff study (2000) which focused on exploring the effect that cultural factors such as language effected how the participants interpreted their environment. This study highlighted the difference task, which tended to be more accurate depending if the stimuli lay on a cross colour boundary and also one that was established by the individual’s own culture and language. There is evidence that the boundary between blue and green is universal, but others have not been established (Goldstein, Davidoff, & Roberson, 2008, p. 234) It should be noted that some of the interpretations put forward by Roberson, such as that the defining features of a colour category is the boundary rather than the focus, have been challenged (Regier & Kay, 2009, p. 9).

Despite the differences in conclusions, these studies have identified significant difference in the set task. Therefore, this raised opportunities for further lines of investigation. As mentioned above, identifying sub groups of the creative field may lead to more a more accurate response on the colour perception task. As discussed by Goldstein,
Davidoff, and Roberson, it would appear that a prior awareness of a colour identification name increased identification (2008, p. 234). This suggests that a greater awareness of colour identification structures may affect the outcome of the task, which would in turn raise the query: would an individual in a specifically visual field have a more accurate response? This would raise the potential that different creative fields may have a significant difference, however due to a low sample size and lack of further sub grouping in the current study this has not yet been identified.

In this study, no correlation was found between sensitivity and colour perception. This suggests conflicting evidence to previous studies on highly sensitive individuals having a different method of interacting with their environment (Aron & Aron, 1997, p. 351). In addition it gives contradictory evidence to studies in relation to sensitivity on change perception (Jagiellowicz, et al., 2011, p. 46). In particular, the Jagiellowicz, Xu, Aron, Aron, Cao, Feng, and Weng study found individuals scoring highly on the Highly Sensitive Person measure tended to display a “greater brain activation in an additional network of functional brain areas that appear to be involved in visual attention and oculomotor processes” (2011, p. 36). This study is also noted a low accuracy response despite identifying increased brain activation (2011, p. 36). This in addition to the data gathered in the current study, it may suggest further areas of research. One line of questioning may be to follow the Jagiellowicz, Xu, Aron, Aron, Cao, Feng, and Weng study but instead of change perception use a colour perception task, similar to the Roberson, Davies, and Davidoff study (2000) or the current study. Potentially, this would explore if there is a difference in brain activation. Limitations on the suggested study would be similar to those noted above in relation to accessing the relevant sample. In addition, as the individuals categorised as sensitive identified using a
self-assessment measure after commencing the study. Due to this, there would be a limitation to carry out purposeful sampling.

Alternatively, further areas that may be developed from the current area of research may be taken in to two routes. One position would be to take the outline and structure of the current study and add a timing element. By including a time element, it would limit the time that the participant is exposed to the stimuli, which in turn may limit the response to the immediate reaction and this may result in greater accuracy on the task. This altered method would also have the additional limitations mentioned above in relation to creating a larger opportunity for a null response. The alternative route would be to structure a proposed study after the Jagiellowicz, Xu, Aron, Aron, Cao, Feng, and Weng, but substitute the colour perception task. Limitations to this approach would include access to the relevant equipment in addition to the previously mentioned sampling issues.

Strengths and limitations of the current study

On review of the structure of the study, it would appear that there is a broad range of cultural backgrounds among the participants. This effect would seem to be an outcome of the use of snowball sampling. The initial participants were provided with the link to the survey. The participants were then able to pass this on to any acquaintances that they saw fit and in this case it has resulted in a relatively large amount of international participants. This outcome could not have been predicted prior to the study being conducted. In particular, there was a high response rate from participants identifying as Swedish (N = 16). In order to
preserve anonymity for the participants, those identifying as other nationalities have been grouped into Other (n = 8).

Figure 13 - Pie chart of nationality

The gender imbalance is apparent in the response of males (n = 17) and females (n = 57), but again this was not something that could have been predicted. In this case, the use of snowball sampling reduces the control of gender of participants. Potentially, a greater use of convenience sampling may have been able to address this as a factor. However, as gender was not specified in any of the hypothesis, this should not have had a major effect on the overall study.
In relation to the measures used during the study, several limitations have been mentioned above. One particular area is the limitations applied due to the restrictions surrounding several of the measures. Should further research be considered, use may be made of the Torrance Test of Creativity and Thinking. As discussed, the results for this particular measure are more subjective due to the approach, however, there would be more flexibility on extending any proposed study across cultural boundaries. This may prove to be of use if the data provided by the international participants prove to be of significant differences.

Limitations also effected the restriction of colour used. Further studies may choose to utilise different selections of colour samples. For example the National Colour System (NCS) (NCS Colour, 2014) may prove to be of use. As it is also an international standard, it may allow for replication. In order to make the most effective use from either option, a pilot study comparing the use of colour samples from the Munsell chart to the use of National Colour System samples may be of benefit. This would allow further studies to establish which option would provide the correct challenge for each level of difficulty.

A limitation that may affect the study would be the reliance on self-report on the questionnaire element of the Highly Sensitive Person and the Remote Associates Test. For the first, there may be an element of social desirability effect, which may lead participants to present themselves in the most positive light possible. Going forward, there may be some attempt to balance this effect by mixing the Highly Sensitive Person element with other questionnaires in order to get a more accurate response. The other risk in this would be the access to online responses to the Remote Associates Test. It would seem to be unlikely that
any of the participants had accessed answers online in this case as there were no outliers, but again it may be an element to monitor on any future study.

**Additional Findings**

As noted above, an unintended consequence of this study was a relatively high respondent rate from international participants. In particular, there was a high volume of participants from Sweden. Therefore, this has raised the potential for exploratory investigations. The studies carried out by Roberson, Davies and Davidoff (2000) and Goldstein, Davidoff and Roberson 2008) have linked cultural factors, in particular language, with the accuracy on a colour perception task. Developing from this, it would raise potential for other cultural factors that may have an effect on an individual’s interaction with their environment. To explore this further, an additional hypothesis is proposed to make use of the available dataset: that there would be an association between cultures on colour perception.

**Chi-Square Tests**

<table>
<thead>
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<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
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<td>Pearson Chi-Square</td>
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<td>10.00</td>
<td>0.37</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>11.72</td>
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<td>0.30</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
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<td>0.10</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>54.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 18 cells (81.8%) have expected count less than 5. The minimum expected count is .24.
**Symmetric Measures**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
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<td>.447</td>
</tr>
<tr>
<td></td>
<td>Cramer's V</td>
<td>.447</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>

Figure 15 - Symmetric Measures

A Chi-square test for association found that there was no significant relationship between the colour perception task and nationality (X² (1, N=54) = 10.80, p = .37). Therefore the null hypothesis must be accepted. However, given that the assumptions are violated, this must be treated with caution. Potentially, with a following study with a larger sample size, there may be more accurate result.

Again, there were no significant findings with the data provided. However, as the data was discovered during the course of the main study it was perhaps not focused enough on the correct area. Therefore, there is potential for further research. To gain an accurate response, any further studies would need to be designed specifically to be cross cultural and cross linguistic. As noted in the Jagiellowicz, Xu, Aron, Aron, Cao, Feng, and Weng study (2011), difficulties can arise in the translation of a measure. In addition, as the Remote Associates Test is very obviously language specific. An alternative such as the Torrance Test of Creativity and Thinking which makes use of picture based exercises (Chamorro-Premuzic, 2011, p. 321) may be considered.
**Reading List**


APPENDIX

Appendix A – copy of consent form

My name is Emma Harvey and I am conducting research in the Department of Psychology, DBS, that explores correlation between creativity, SPS and colour categorisation. This research is being conducted as part of my studies and will be submitted for examination, and may later be used in academic presentations.

You are invited to take part in this study and participation involves completing and returning the attached anonymous survey followed by participation in a short experiment. If any of the questions in the survey or images shown during the experiment raise difficult feelings for you, contact information for support services are included on the final page. Participation is completely voluntary and so you are not obliged to take part.

Participation is anonymous and confidential. Therefore, responses can not be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected. If you are interested in the results of the project, please send me a request on the email below.

The questionnaires will be securely stored and data from the questionnaires will be transferred to electronic format and stored on a password protected computer.

It is important that you understand that by completing and proceeding with the questionnaire you are consenting to participate in the study.

Should you require any further information about the research, please contact:

Emma Harvey, 1753788@mydbs.ie. My supervisor can be contacted at Dr Jonathan Murphy at jonathan.murphy@dbs.ie
Appendix B - Highly Sensitive Person

1. I am easily overwhelmed by strong sensory input.
2. I seem to be aware of subtleties in my environment.
3. Other people's moods affect me.
4. I tend to be very sensitive to pain.
5. I find myself needing to withdraw during busy days, into bed or into a darkened room or any place where I can have some privacy and relief from stimulation.
6. I am particularly sensitive to the effects of caffeine.
7. I am easily overwhelmed by things like bright lights, strong smells, coarse fabrics, or sirens close by.
8. I have a rich, complex inner life.
9. I am made uncomfortable by loud noises.
10. I am deeply moved by the arts or music.
11. My nervous system sometimes feels so frazzled that I just have to go off by myself.
12. I am conscientious.
13. I startle easily.
14. I get rattled when I have a lot to do in a short amount of time.
15. When people are uncomfortable in a physical environment I tend to know what needs to be done to make it more comfortable (like changing the lighting or the seating).
16. I am annoyed when people try to get me to do too many things at once.
17. I try hard to avoid making mistakes or forgetting things.
18. I make a point to avoid violent movies and TV shows.
19. I become unpleasantly aroused when a lot is going on around me.
20. Being very hungry creates a strong reaction in me, disrupting my concentration or mood.
21. Changes in my life shake me up.
22. I notice and enjoy delicate or fine scents, tastes, sounds, works of art.
23. I find it unpleasant to have a lot going on at once.
24. I make it a high priority to arrange my life to avoid upsetting or overwhelming situations.
25. I am bothered by intense stimuli, like loud noises or chaotic scenes.
26. When I must compete or be observed while performing a task, I become so nervous or shaky that I do much worse than I would otherwise.
27. When I was a child, my parents or teachers seemed to see me as sensitive or shy.
### Appendix C – Remote Associates Test

<table>
<thead>
<tr>
<th>Triad</th>
<th>Solution</th>
<th>Difficulty</th>
<th>p(unsolved)</th>
<th>Normalized</th>
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<tbody>
<tr>
<td>Falling Actor Dust</td>
<td>STAR³</td>
<td>0.15</td>
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<tr>
<td>Broken Clear Eye</td>
<td>GLASS²</td>
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<td>-2.06</td>
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<tr>
<td>Widow Bite Monkey</td>
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<tr>
<td>Coin Quick Spoon</td>
<td>SILVER³</td>
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<td>-1.44</td>
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<tr>
<td>Gold Stool Tender</td>
<td>BAR²</td>
<td>0.3</td>
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<td>Blood Music Cheese</td>
<td>BLUE¹</td>
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<tr>
<td>Manners Round Tennis</td>
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<tr>
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<tr>
<td>Snack Line Birthday</td>
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<td>-0.5</td>
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<td>Measure Desk Scotch</td>
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### Appendix C – Coding for Colour Perception Task

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<td>R G170 B0</td>
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<td>4</td>
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<td>R145 G60 B105</td>
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<td>R255 G130 B20</td>
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Appendix D – Table of figures

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<td>Descriptive Statistics</td>
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<td>Independent samples t test for overall colour perception task</td>
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<td>Correlation table for sensitivity and creativity</td>
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<td>6</td>
<td>Scatterplot of correlation between sensitivity and creativity</td>
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<td>7</td>
<td>Correlation table for sensitivity and colour perception</td>
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</tr>
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<td>8</td>
<td>Scatterplot of correlation between sensitivity and colour perception within group (near)</td>
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<td>Correlation between Sensitivity and without group</td>
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<td>Scatterplot of correlation between sensitivity and colour perception on without group (near)</td>
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<td>Correlations between Sensitivity, Creativity and Colour Perception</td>
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<td>Pie chart of nationality</td>
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<td>14</td>
<td>Chi Square Test</td>
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<td>15</td>
<td>Symmetric Measures</td>
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</table>
Appendix E – Print copy of online project

Welcome to my Thesis Project

My name is Emma Harvey and I am conducting research in the Department of Psychology, DBS, that explores correlation between creativity, SPS and colour categorisation. This research is being conducted as part of my studies and will be submitted for examination, and may later be used in academic presentations.

You are invited to take part in this study and participation involves completing and returning the attached anonymous survey followed by participation in a short experiment. Participation is completely voluntary and so you are not obliged to take part.

Participation is anonymous and confidential. Therefore, responses can not be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected. If you are interested in the results of the project, please send me a request on the email below.

The questionnaires will be securely stored and data from the questionnaires will be transferred to electronic format and stored on a password protected computer.

It is important that you understand that by completing and proceeding with the questionnaire that you are consenting to participate in the study.

Should you require any further information about the research, please contact:

Emma Harvey,

My supervisor, Dr Jonathan Murphy, can be contacted at jonathan.murphy.

1) I understand that by continuing I am consenting to participate in the study

Yes
No

2) Age:


3) Gender:
Male
Female

4) Nationality:

5) Do you have or are you currently:

- working towards a qualification in the creative arts (e.g., photography, writing, painting, etc)
  
- working in the creative arts?
  
- both?
  
- neither?

HSP

6) Answer each question according to the way you personally feel. Check the "yes" box if it is at least somewhat true for you; check the "no" if it is not very true or not at all true for you.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>I am easily overwhelmed by strong sensory input</td>
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<td></td>
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<tr>
<td>I seem to be aware of subtleties in my environment</td>
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<td></td>
</tr>
<tr>
<td>Other people's moods affect me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I tend to be very sensitive to pain</td>
<td></td>
<td></td>
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<tr>
<td>I find myself needing to withdraw during busy days, into bed or into a darkened room or any place where I can have some privacy and relief from stimulation</td>
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<tr>
<td>I am particularly sensitive to the effects of caffeine</td>
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<td></td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am easily overwhelmed by things like bright lights, strong smells, coarse fabrics, or sirens close by</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have a rich, complex inner life</td>
<td></td>
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<tr>
<td>I am made uncomfortable by loud noises</td>
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<td></td>
</tr>
<tr>
<td>I am deeply moved by the arts or music</td>
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<tr>
<td>My nervous system sometimes feels so frazzled that I just have to go off by myself</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am conscientious</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I startle easily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I get rattled when I have a lot to do in a short amount of time</td>
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<tr>
<td>When people are uncomfortable in a physical environment I tend to know what needs to be done to make it more comfortable (like changing the lighting or the seating)</td>
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<tr>
<td>I am annoyed when people try to get me to do too many things at once</td>
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<tr>
<td>I try hard to avoid making mistakes or forgetting things.</td>
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<td>I make a point to avoid violent movies and TV shows</td>
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<td>I become unpleasantly aroused when a lot is going on around me</td>
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<td>Being very hungry creates a strong reaction in me, disrupting my concentration or mood</td>
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<td>Changes in my life shake me up</td>
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<tr>
<td>I notice and enjoy delicate or fine scents, tastes, sounds, works of art</td>
<td></td>
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<tr>
<td>I find it unpleasant to have a lot going on at once</td>
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<tr>
<td>I make it a high priority to arrange my life to avoid upsetting or overwhelming situations</td>
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</table>
I am bothered by intense stimuli, like loud noises or chaotic scenes

When I must compete or be observed while performing a task, I become so nervous or shaky that I do much worse than I would otherwise

When I was a child, my parents or teachers seemed to see me as sensitive or shy

**Pair 1 - part 1**

http://kwiksurveys.com/UserFiles/263368/images/R0%20G0%20B160_large.png

7) Please click to proceed

Next page

**Pair 1 - part 2**

Example A

http://kwiksurveys.com/UserFiles/263368/images/R0%20G0%20B165_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R0%20G0%20B160_large.png

8) Please choose if Example A or Example B match the previous colour sample

Example A
<table>
<thead>
<tr>
<th>Example B</th>
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**Pair 2 - part 1**

http://kwiksurveys.com/UserFiles/263368/images/R0%20G0%20B160_large.png

9) Please click to proceed

Next page

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<th>Pair 2 - part 2</th>
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Example A

http://kwiksurveys.com/UserFiles/263368/images/R0%20G0%20B175_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R0%20G0%20B160_large.png

10) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

**Pair 3 - part 1**
11) Please click to proceed

Next page

Pair 3 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R0%20G130%20B0_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R0%20G170%20B0_large.png

12) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 4 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R145%20G60%20B100_large.png
13) Please click to proceed

Next page

**Pair 4 - part 2**

Example A

http://kwiks surveys.com/UserFiles/263368/images/R145%20G60%20B105_large.png

Example B

http://kwiks surveys.com/UserFiles/263368/images/R145%20G60%20B100_large.png

14) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

**Pair 5 - part 1**

http://kwiks surveys.com/UserFiles/263368/images/R180%20G100%20B60_large.png

15) Please click to proceed

Next page
Pair 5 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R180%20G100%20B60_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R180%20G120%20B60_large.png

16) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 6 - part 1


17) Please click to proceed

Next page

Pair 6 - part 2

Example A
18) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 7 - part 1

19) Please click to proceed

Next page

Pair 7 - part 2

Example A


http://kwiksurveys.com/UserFiles/263368/images/R0%20G130%20B0_large.png

http://kwiksurveys.com/UserFiles/263368/images/R0%20G140%20B0_large.png
20) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 8 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R80%20G30%20B100_large.png

21) Please click to proceed

Next page

Pair 8 - part 2

Example A


Example B

http://kwiksurveys.com/UserFiles/263368/images/R80%20G30%20B100_large.png
22) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 9 - part 1


23) Please click to proceed

Next page

Pair 9 - part 2

Example A


Example B


24) Please choose if Example A or Example B match the previous colour sample

Example A
Example B

Pair 10 - part 1


25) Please click to proceed

Next page

Pair 10 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R235%20G240%20B0_large.png

Example B


26) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 11 - part 1
27) Please click to proceed

Pair 11 - part 2

<table>
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<tr>
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<table>
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28) Please choose if Example A or Example B match the previous colour sample

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<table>
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Pair 12 - part 1

<table>
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</table>

<table>
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<tr>
<th>Example B</th>
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</thead>
</table>
29) Please click to proceed

Pair 12 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R135%20G60%20B60_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R135%20G60%20B100_large.png

30) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 13 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R240%20G240%20B0_large.png

31) Please click to proceed

Next page
Pair 13 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R245%20G240%20B0_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R240%20G240%20B0_large.png

32) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 14 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R0%20G130%20B0_large.png

33) Please click to proceed

Next page

Pair 14 - part 2

Example A
34) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 15 - part 1

35) Please click to proceed

Next page

Pair 15 - part 2

Example A

http://kwiksveys.com/UserFiles/263368/images/R80%20G30%20B70_large.png
36) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 16 - part 1

http://kwiksulting.com/UserFiles/263368/images/R0%20G130%20B_large.png

37) Please click to proceed

Next page

Pair 16 - part 2

Example A

http://kwiksulting.com/UserFiles/263368/images/R0%20G130%20B_large.png

Example B

http://kwiksulting.com/UserFiles/263368/images/R0%20G130%20B10_large.png
<table>
<thead>
<tr>
<th>Question</th>
<th>Example A</th>
<th>Example B</th>
</tr>
</thead>
<tbody>
<tr>
<td>38) Please choose if Example A or Example B match the previous colour sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pair 17 - part 1</td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R150%20G60%20B100_large.png" alt="Image" /></td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R145%20G60%20B100_large.png" alt="Image" /></td>
</tr>
<tr>
<td>Pair 17 - part 2</td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R145%20G60%20B100_large.png" alt="Image" /></td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R150%20G60%20B115_large.png" alt="Image" /></td>
</tr>
<tr>
<td>39) Please click to proceed</td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R150%20G60%20B100_large.png" alt="Image" /></td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R150%20G60%20B115_large.png" alt="Image" /></td>
</tr>
<tr>
<td>40) Please choose if Example A or Example B match the previous colour sample</td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R150%20G60%20B100_large.png" alt="Image" /></td>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R150%20G60%20B115_large.png" alt="Image" /></td>
</tr>
</tbody>
</table>
Example B

<table>
<thead>
<tr>
<th>Pair 18 - part 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://kwiksurveys.com/UserFiles/263368/images/R255%20G130%20B0_large.png">http://kwiksurveys.com/UserFiles/263368/images/R255%20G130%20B0_large.png</a></td>
</tr>
<tr>
<td>41) Please click to proceed</td>
</tr>
<tr>
<td>Next page</td>
</tr>
</tbody>
</table>

Example A

<table>
<thead>
<tr>
<th>Pair 18 - part 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example A</td>
</tr>
<tr>
<td><a href="http://kwiksurveys.com/UserFiles/263368/images/R255%20G130%20B0_large.png">http://kwiksurveys.com/UserFiles/263368/images/R255%20G130%20B0_large.png</a></td>
</tr>
<tr>
<td>Example B</td>
</tr>
<tr>
<td>42) Please choose if Example A or Example B match the previous colour sample</td>
</tr>
<tr>
<td>Example A</td>
</tr>
<tr>
<td>Example B</td>
</tr>
</tbody>
</table>

Pair 19 - Part 1
43) Please click to proceed
Next page

Pair 19 - part 2

Example A

http://kwiks surveys.com/UserFiles/263368/images/R235%20G240%20B100_large.png

Example B

http://kwiks surveys.com/UserFiles/263368/images/R240%20G240%20B100_large.png

44) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 20 - part 1

http://kwiks surveys.com/UserFiles/263368/images/R180%20G100%20B20_large.png
45) Please click to proceed

Next page

**Pair 20 - part 2**

Example A

http://kwiksurveys.com/UserFiles/263368/images/R180%20G100%20B40_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R180%20G100%20B20_large.png

46) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

**Pair 21 - part 1**

http://kwiksurveys.com/UserFiles/263368/images/R180%20G0%20B20_large.png

47) Please click to proceed

Next page
Pair 21 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R180%20G0%20B20_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R140%20G0%20B20_large.png

48) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 22 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R200%20G0%20B0_large.png

49) Please click to proceed

Next page

Pair 22 - part 2

Example A
50) Please choose if Example A or Example B match the previous colour sample

Example A
Example B

51) Please click to proceed

Next page
52) Please choose if Example A or Example B match the previous colour sample

Example A
Example B

Pair 24 - part 1

http://kwiksrent.com/UserFiles/263368/images/R150%20G60%20B60_large.png

53) Please click to proceed

Next page

Pair 24 - part 2

Example A

http://kwiksrent.com/UserFiles/263368/images/R200%20G60%20G60_large.png

Example B

http://kwiksrent.com/UserFiles/263368/images/R150%20G60%20B60_large.png
54) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 25 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R145%20G60%20B100_large.png

55) Please click to proceed

Next page

Pair 25 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R135%20G60%20B100_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R145%20G60%20B100_large.png

56) Please choose if Example A or Example B match the previous colour sample

Example A
Pair 26 - part 1

57) Please click to proceed

Pair 26 - part 2

58) Please choose if Example A or Example B match the previous colour sample
59) Please click to proceed

Next page

Pair 27 - part 2

Example A

Example B

60) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 28 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R170%20G60%20B100_large.png
61) Please click to proceed

Next page

**Pair 28 - part 2**

Example A

[Image: http://kwiksures.com/UserFiles/263368/images/R170%20G65%20B%20100_large.png]

Example B

[Image: http://kwiksures.com/UserFiles/263368/images/R170%20G60%20B100_large.png]

62) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

**Pair 29 - part 1**


63) Please click to proceed

Next page
Pair 29 - part 2

Example A


Example B


64) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 30 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R0%20G170%20B0_large.png

65) Please click to proceed

Next page

Pair 30 - part 2

Example A
66) Please choose if Example A or Example B match the previous colour sample

<table>
<thead>
<tr>
<th>Example A</th>
<th>Example B</th>
</tr>
</thead>
</table>

**Pair 31 - part 1**

67) Please click to proceed

| Next page |

**Pair 31 - part 2**

Example A

68) Please choose if Example A or Example B match the previous colour sample

<table>
<thead>
<tr>
<th>Example A</th>
<th>Example B</th>
</tr>
</thead>
</table>

Pair 32 - part 1


69) Please click to proceed

Next page

Pair 32 - part 2

<table>
<thead>
<tr>
<th>Example A</th>
<th>Example B</th>
</tr>
</thead>
</table>


70) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

**Pair 33 - part 1**

http://kwiksurveys.com/UserFiles/263368/images/R180%20G100%20B30_large.png

71) Please click to proceed

Next page

**Pair 33 - part 2**

Example A

http://kwiksurveys.com/UserFiles/263368/images/R180%20G100%20B60_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R180%20G100%20B30_large.png

72) Please choose if Example A or Example B match the previous colour sample

Example A
Example B

Pair 34 - part 1

http://kwiksurveys.com/UserFiles/263368/images/R70%20G0%20B180_large.png

73) Please click to proceed

Next page

Pair 34 - part 2

Example A

http://kwiksurveys.com/UserFiles/263368/images/R70%20G0%20B180_large.png

Example B

http://kwiksurveys.com/UserFiles/263368/images/R70%20G0%20B170_large.png

74) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

Pair 35 - part 1
75) Please click to proceed

Next page

**Pair 35 - part 2**

Example A

http://kwiksveys.com/UserFiles/263368/images/R255%20G130%20B0_large.png

Example B

http://kwiksveys.com/UserFiles/263368/images/R255%20G130%20B20_large.png

76) Please choose if Example A or Example B match the previous colour sample

Example A

Example B

**Pair 36 - part 1**

http://kwiksveys.com/UserFiles/263368/images/R250%20G240%20B0_large.png
77) Please click to proceed

Next page

**Pair 36 - part 2**

<table>
<thead>
<tr>
<th>Example A</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R250%20G240%20B60_large.png" alt="Example A" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="http://kwiksurveys.com/UserFiles/263368/images/R250%20G240%20B0_large.png" alt="Example B" /></td>
</tr>
</tbody>
</table>

78) Please choose if Example A or Example B match the previous colour sample

<table>
<thead>
<tr>
<th>Example A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**RAT**

79) This is a Remote Association Test - it is measuring how you see relationships between different ideas.

Each of the cues have three words, please type in the fourth linking word:

For example:
Cottage - Swiss - Cake -> Cheese
or
Paint - Doll - Cat -> House
Please put the first word that comes to mind - there is no wrong answer!

<table>
<thead>
<tr>
<th>Falling</th>
<th>Actor</th>
<th>Dust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken</td>
<td>Clear</td>
<td>Eye</td>
</tr>
<tr>
<td>Widow</td>
<td>Bite</td>
<td>Monkey</td>
</tr>
<tr>
<td>Coin</td>
<td>Quick</td>
<td>Spoon</td>
</tr>
<tr>
<td>Gold</td>
<td>Stool</td>
<td>Tender</td>
</tr>
<tr>
<td>Blood</td>
<td>Music</td>
<td>Cheese</td>
</tr>
<tr>
<td>Manners</td>
<td>Round</td>
<td>Tennis</td>
</tr>
<tr>
<td>Salt</td>
<td>Deep</td>
<td>Foam</td>
</tr>
<tr>
<td>Lick</td>
<td>Sprinkle</td>
<td>Mines</td>
</tr>
<tr>
<td>Snack</td>
<td>Line</td>
<td>Birthday</td>
</tr>
<tr>
<td>Cherry</td>
<td>Time</td>
<td>Smell</td>
</tr>
<tr>
<td>Strap</td>
<td>Pocket</td>
<td>Time</td>
</tr>
<tr>
<td>Colour</td>
<td>Numbers</td>
<td>Oil</td>
</tr>
<tr>
<td>Silk</td>
<td>Cream</td>
<td>Even</td>
</tr>
<tr>
<td>Big</td>
<td>Leaf</td>
<td>Shade</td>
</tr>
<tr>
<td>Measure</td>
<td>Desk</td>
<td>Scotch</td>
</tr>
<tr>
<td>Rock</td>
<td>Times</td>
<td>Steel</td>
</tr>
<tr>
<td>Thread</td>
<td>Pine</td>
<td>Pain</td>
</tr>
<tr>
<td>Cotton</td>
<td>Bathtub</td>
<td>Tonic</td>
</tr>
<tr>
<td>Inch</td>
<td>Deal</td>
<td>Peg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Bump - Throat - Sum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blank - White - Lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stick - Light - Birthday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sore - Shoulder - Sweat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>