



**LSPA**  
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*“YOU ARE NEVER TOO OLD TO BE YOUNG”*:  
THE EFFECT OF PRIMING A CHILDLIKE  
MINDSET THROUGH WALT DISNEY PICTURES  
ON DIVERGENT THINKING

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## Resumo

A criatividade é considerada uma característica chave para ocorrer inovação nesta “era da criatividade” que estamos a viver presentemente na sociedade actual. O apelo à criatividade no nosso dia-a-dia levou a que a investigação se debruçasse sobre a identificação de formas eficazes de aumentar a criatividade. “Pensar como um criança” tem sido um mantra frequentemente apregoado como fórmula para o aumento da criatividade - nomeadamente o pensamento divergente - porém, este cliché popular tem recebido quase nenhuma atenção de investigação empírica. Procuramos primar os nossos participantes com um mindset de criança, através da exposição do vídeo de abertura da Walt Disney Pictures, prevendo que isto iria aumentar o desempenho em medidas de pensamento divergente - nomeadamente em fluência, flexibilidade e originalidade. Resultados para as medidas de flexibilidade e originalidade não foram significativas. Por outro lado, a fluência aparentou ser ligeiramente inibida após exposição ao estímulo da Disney. Surpreendentemente, numa das condições de controle onde os participantes assistiram ao vídeo de abertura da 20th Century Fox, foram encontrados os níveis mais elevados de fluência. Discutimos os nossos resultados à luz de teorias de activação e foco regulatório, processamento local e global, e os efeitos cognitivos e comportamentais da nostalgia. Deliberamos ainda de forma breve sobre a conceito de honestidade (associado à marca Disney) no pensamento divergente. Limitações do estudo são discutidas e direcções futuras são fornecidas.

**Palavras-chave:** Mindset de criança; criatividade; pensamento divergente; primar; Disney

## **Abstract**

Being creative is considered a key characteristic for innovation in the so-called “creativity age” that we are currently living in modern society. The cry for creativity in our day-to-day lives has been a major driver in focusing investigation on the search for effective ways in which creativity may be enhanced. “Thinking like a child” has been an oft-touted mantra as a formula for increasing creativity - namely divergent thinking (DT) - yet this popular cliché has received close to no empirical investigation. We sought to prime individuals with a childlike mindset through exposure to the Walt Disney Pictures opening logo video clip, predicting that this would increase performance in DT measures - specifically in fluency, flexibility and originality. Results for flexibility and originality scores were not significant. Unexpectedly, fluency was shown to be slightly inhibited when exposed to the Disney stimulus. Surprisingly, in one of the control conditions, where participants watched the 20th Century Fox opening logo video, fluency scores were highest. Our results are discussed in light of behaviour activation and regulatory-focus theories, global and local processing, and the cognitive and behavioural effects of nostalgia as well as briefly deliberating over the concept of honesty (associated to the Disney brand) and DT. Limitations of the study are also discussed and future directions are provided.

**Key-words:** Childlike mindset; creativity; divergent thinking; priming; Disney

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## Introduction

*“And sooner or later, Nana, people have to grow up”*

George Darling, in Peter Pan (Disney, 1953)

Society and, particularly, the western education system, reminds us time and again that we must grow up and mature to become successful men and women in the world. And most of us do. We are all familiar, however, with a certain character adapted by Walt Disney Pictures who never grew up - Peter Pan. In the feature film we are led through his wondrous adventures, through the storytelling of a young girl, Wendy Darling - the eldest sibling to John and Michael Darling - who is days away from having to “grow up”, much to her anguish. Wendy and the boys fill their imagination with wonderful stories from the world of Peter Pan, where pirate ships, mermaid lagoons, and Indian hideouts make up the magical island of Neverland and where children can fly - it is also a world where children never grow up. Understandably, Wendy’s father, George Darling, believes this to be “nonsense” and “absolute poppycock”, being himself a practical adult. It is only when there is a momentary lapse of his adulthood that he is finally able to see Peter Pan’s ship outlined in the clouds, in the sky: a ship, we are told, that he has “the strangest feeling [of having seen] before, a long time ago, when [he] was very young”.

The story tells us that such wild imagination and wondrous tales of mermaids and flying children could have only come from the mind of a child, free from all barriers and constraints of rule-bound thinking, norms and structures which guide adulthood. Moreover, even a practical man such as George Darling was finally able to make out shapes in the clouds when he embraced his *inner child*. Be that as it may, what role could this childlike creative thinking ability play in the real world?

Nearly all sectors in our modern society benefit from creativity, from advertising agencies to high tech companies, university classrooms to political groups, full-time parenting to the generation of scientific hypotheses, as well as being a factor in increasing psychological well-being (for a review of creativity contributions in diverse areas see Plucker, Beghetto & Dow, 2004). Globally, we are at a point of transition from the “information age to the creativity age” (Tang, 2017, p.3), where creative potential and ideational production are key factors that “drive civilization forward” (Hennessey & Amabile, 2010, p.570). The cry for

creativity in our day-to-day lives has been a major driver in focusing investigation on the search for effective ways in which creativity may be enhanced.

The focus of our investigation dwells upon enhancing creativity, specifically if it is possible to augment creative thinking through priming a boundary-less, childlike mindset in adults. An empirical investigation was put together hoping to shed light on this hypothesis, taking into account the existing literature on creativity, divergent thinking, priming and childlike thinking, which are summarily discussed below, and discussed at length in appendix A.

## **Creativity and DT**

Although the concept of creativity has been lacking a concrete definition, probably due to its complex nature, reviews and other attempts at generating a standard definition of creativity have been able to shed light on some of its key features (Rhodes, 1961; Plucker et al., 2004; Kamylyis & Valtanen, 2010). When thoughts turn to creativity, words such as “different”, “novel” and “original” may come to mind. However, authorities on the matter agree that an idea or product that is “new” is not a sufficient condition for creativity - it must also be useful, appropriate and/or produce meaning or value (Feist, 2010). Several measures of creativity have been produced since the beginnings of research on creativity, each one emerging from a focus on a different facet of creativity. For instance, focus on the characteristics of the creative individual led to self-rated personality scales which sought to identify creative talent in individuals (e.g. the Creative Personality Scale; Gough, 1979) and differences between creative groups of individuals (such as successful architects) and their not-so-accomplished peers (e.g. MacKinnon, 1965). An interest in creative outcomes led to production-achievement measures, mainly used to measure the quality (e.g. the Creative Achievement Questionnaire; Carson, Peterson, & Higgins, 2005) and quantity of creative outcomes (e.g. the Creative Behavior Inventory; Hocevar, 1979), focusing on one’s creative achievements. Contrarily, creative ideation-potential measures do not assess the actual creative product per se, but rather are a measure of what *might occur* when faced with other creative endeavors (the potential to be creative). These tests mostly involve demonstration of skills (e.g. in divergent and convergent thinking tasks) or outright questioning of frequency of ideation per day (e.g. the Runco Ideational Behavior Scale; Runco, Plucker, & Lim, 2001).

Divergent thinking (DT) is a key ability for producing creative outcomes. It is the skill to produce an array of responses, solutions and/or ideas, which extend beyond the given information (Guilford, 1959) - a little like perceiving ships in clouds in the sky. To an extent, it may be comparable to the overly-used metaphor of “thinking outside the box”. As mentioned briefly above, DT measures are designated as creative potential tests (Puryear, Kettler & Rinn, 2017). In other words, these tests estimate the *potential* for creative thinking to occur (Runco & Okuda, 1991) - they are mere *indicators* - which is something quite different from assuming that DT is the same as creative thinking (Runco & Acar, 2012). Consequently, DT tests typically address four abilities, which do not necessarily include producing novel and appropriate outcomes: *Fluency*, the number of responses generated; *flexibility*, the number of different categories of response; *originality*, the uniqueness of response; and *elaboration*, the amount of detail contained in a response (Guilford, 1959).

### **Children and DT**

*“Our greatest national resource is the minds of our children.”*

Walt Disney (personal communication, n.d.)

How often do parents despair when their 4-year-olds prefer to amuse themselves with the cardboard box and the hundreds of different uses they have found for it, as opposed to the expensive toy which came inside? Not unlike the Walt Disney’s mermaid, Ariel (Disney, 1989), who boldly decided that the best use for a fork would be for brushing her hair the first time she laid eyes on the unknown object, this demonstration of DT is emblematic in young children, particularly in toddlers, as they lack clearly defined conventions of the use of common objects. Furthermore, children’s spontaneity and low self-consciousness (Zabelina & Robinson, 2010), simplicity (Lindley, 2017) and inherent curiosity (Urban, 1991) help to facilitate DT. In the words of the author Paul Lindley (2017, p.19), “creativity is not just something they do well, but a central part of who they are.”

According to creativity development theories, children up to the ages of about 6-8 are said to belong to the preconventional stage, where they produce novelties in a spontaneous, non stereotyped fashion, lacking biases from experience (Rosenblatt & Winner, 1988). This “ability”, however, is lost as children grow up (Cropley, 2001; Rosenblatt & Winner, 1988). Up to the age of 10-12, children enter the conventional stage and conform to rule-bound

thinking, norms and structures, diminishing creative production. In the postconventional stage (from 12 years of age onwards) children and adults may opt to reject conventions even though they are aware of them, however, the fact that there is *awareness* of external constraints and rules is in itself a barrier for free and fluid DT.

In one longitudinal study (Land & Jarman, 1992), 5 year olds were given the alternative uses test which is constructed to measure DT. Of the 1600 preschoolers who took the test, an astounding 98% scored in the highly creative potential range. The same children took the test when they were 10 years old, again when they were 15 and once more at the age of 23. Surprisingly, instead of demonstrating that they grew better at DT as they grew into mature adults, a significant decrease in the percentage of children scoring in the highly creative range was shown, culminating in only a mere 2% of the over-23's scoring as "highly creative" (see Table 1). It is only natural to ask, what happened along the way?

Table 1

*Test results for the alternative uses test in the longitudinal study by Land and Jarman (1992)*

Age group tested	Number tested	% who scored in the 'highly creative' range
5 year olds	1,600 children	98
10 year olds	1,600 children	30
15 year olds	1,600 children	12
25+ year olds	280,000 adults	2

*Note: Adapted from Vint (2005)*

The finger has often been pointed at the education system. Although children demonstrate astoundingly creative and innovative capacities, it seems they are being educated out of it as they grow up (Robinson, 2006). The reason children are so good at DT may be attributed to the simple fact that they "look at the world with fresh eyes" (Vint, 2005, p.20) - where no preconceived boundaries and filters hold back free thinking, exploration and experimentation - whereas schools and education in general guide us back to predefined tracks. We stigmatize mistakes, teach that there is always a right or wrong answer, and essentially narrow down the view (Robinson, 2006, 2010). Furthermore, consistent findings indicate that even educators who claim to value creativity in the classroom seem to

discourage creative behaviour in their pupils, as they typically have a negative view of traits most associated to creativity which are, in no doubt, disruptive of the normal traditional functioning of a classroom (see review in Westby & Dawson, 1995). Education drives conformity, and creativity is unlearned.

### **Thinking Like a Child**

*"You're never too old to be young."*

Happy, in Snow White and the Seven Dwarfs (Disney, 1937)

It is without a doubt that adulthood, in its premeditative and cognitively controlled form, comes with a series of upsides (Zabelina & Robinson, 2010), however, these same benefits may prove to diminish creative thinking, as the “adult world” is laden with rules, routines and structures which in turn bound so-called out-of-the-box thinking.

One oft touted mantra for increasing creativity has been to “think like a child” (e.g. Indurkha, 2013, p.38). In the words of Piaget, “if you want to be creative, stay in part a child, with the creativity and invention that characterizes children before they are deformed by adult society.” (as cited in Kets de Vries, 2012, p.26). The appeal to think like a child is also a recurrent theme in many famous quotes from renown creative figures such as actor and comedian John Cleese who insists that “the most creative people have this childlike facility to play” (brainyquote, n.d.), Portuguese modern painter Julio Pomar who agrees that he “ended up painting like a child” (Caetano, 2018) and even the great Dr.Seuss who, in his simple manner, contends that “adults are obsolete children” (Nel, 2012). This line of thinking is shared through common knowledge and popular literature - a cliché that has received close to no empirical investigation.

Research on play - which we may interpret as a childish facet - and the trait of playfulness in adults has been the single line of investigation which we may consider to have come closer to providing some clues for the validity of this popular belief. Priming playfulness through role playing games successfully increased scores in fluency and originality (Karwowski & Soszynski, 2008), creating a playful workplace setting increased scores in an individual DT measure as well as in group creative productions (West, Hoff & Carlsson, 2017), offering play-cues (sweets) at a meeting augmented the creativity climate in terms of openness, engagement and participation (West & Hoff, 2016), and labeling a puzzle

task as a play task instead of a work task showed to influence the fluency, length and vocabulary variability of sentence creation (Glynn, 1994). The trait of playfulness in adults has also demonstrated a link to higher self reports of creativity (Bateson & Nettle, 2014; Proyer & Ruch, 2011).

One enlightening study, however, clearly demonstrated that a childlike mindset is amenable to a priming manipulation and that thinking like a child facilitated originality scores on a DT task (Zabelina & Robinson, 2010). University students were asked to imagine that school was cancelled for the day and were exhorted to write about what they would “do, think and feel in such a situation” (Zabelina & Robinson, 2010). In the primed condition the prompt ended with “You are 7 years old”, which was the only difference from the experimental to the control condition. To measure DT, participants were subjected to the Abbreviated Torrance Test for Adults (ATTA) which is a short version of the Torrance Test of Creative Thinking (TTCT), a highly used DT measure that uses a battery of verbal and figural tests which prompt participants to generate a response from a given stimulus (such as requiring participants to draw a picture from incomplete figures). The abbreviated ATTA only uses three of the tests from the TTCT and scores for fluency and originality. The results demonstrated that the students primed with a think-like-a-child mindset produced significantly more original outcomes in the ATTA than their peers. Oddly, and though often cited for their findings, there seems to have been no follow up to these promising results from the authors or other potentially interested investigators.

### **Walt Disney Pictures**

How bizarre would it be if your boss asked you to imagine yourself as a 7-year-old before performing tasks where he would like you to think out-of-the-box?

In our adult world, suggestions of this nature - perhaps due to some degree of skepticism - rarely sound reasonable. On the other hand, it may not be unreasonable to trigger this childlike thinking through other means, to achieve the same outcome. For instance, priming studies have largely shown that environmental cues can have powerful influences on subsequent behaviour, beyond the individual’s awareness (Bargh & Chartrand, 2000). One such study had undergraduates perform the alternative uses test after subliminal exposure of the Apple Macintosh logo or the IBM logo (Fitzsimons, Chartrand & Fitzsimons, 2008).

Participants in the Apple condition were expected to score higher in the test due to priming with the Apple logo which is specifically associated to a Think Different mindset, considering that “priming effects are likely to be triggered anytime the prime and the behavior being measured share associations” (Fitzsimons et al., 2008, p.23). As predicted, Apple-primed participants outperformed the IBM group in DT. What we can draw from this investigation is that exposure to a brand may alter behaviour due to priming a mindset rooted in the personality or concepts associated with the brand. In the same way, we would expect a brand which is highly associated to “be a child” to prime a childlike mindset and associated behaviour.

The Walt Disney Company is an example of one such brand. Reaching every corner of the globe, Disney has accompanied most of modern day adults throughout their lives, be it through the beloved animations and films, loveable soundtracks, sensational theme parks or greatly sold merchandise. Specifically, the Walt Disney Pictures film studio produces animations and feature films which are childlike in their very nature. Besides, we can all relate to the feelings of childlike innocence and warmth when the familiar castle and “when you wish upon a star” tune from the opening logo start to sound on-screen, signaling that we are about to watch some *Disney magic*. In fact, Walt Disney himself could not have put it better when he stated: “I do not make films primarily for children. I make them for the child in all of us, whether he be six or sixty.” (Sources of Insight, n.d.).

Considering what has been discussed above, it is not farfetched to hypothesize that exposure to a Disney stimulus may enhance DT through priming a childlike mindset in adults. Using Disney as stimulus for inducing a childlike mindset is pertinent in the sense that its use may be applied indirectly without outright instruction to “imagine you are a child”, which is not practical in the real world. Nevertheless, the use of such an emotionally rich and complex stimulus may cause some difficulty in singling out the mechanisms that are at work if DT is thus influenced. Hence, it is of importance to discuss two investigated mediators of DT - mood and nostalgia - which are also strongly associated to Disney.

Despite the odd Disney critic, search social media and you will find that people tend to express highly positive emotions towards Walt Disney Pictures - where even strong emotions (e.g. love) are expressed (I Love Disney, n.d.) - be it towards the characters, the

plot, the music or the *magic* displayed on screen. Mood has been shown to influence DT, where positive affect, for instance, has usually been attributed to the generation of more unusual or original responses (Isen, Johnson, Mertz & Robinson, 1985; Lewis, Dontcheva & Gerber, 2011).

Similarly, if one were to search “Disney Opening Scene” on Youtube, and analyze the public comments left on the most viewed clips, one would not help but notice the number which rest upon nostalgic sentiments: “Reminds me of my childhood” (Queen of Swords, 2015), “I GET SO MUCH CHILLS AND MEMORIES” (Colonna, 2016), “Something enters in my eye everytime i see this intro. That thing must be the Nostalgia... I magically cry.” (Karmo1991, 2016)<sup>1</sup>. The cognitive component of nostalgia - unlike its emotional facet - has shown to increase performance in DT tasks, such as the alternative uses task (Ye, Ngan & Hui, 2013) and the “Duncker Candle Problem” (Ibrahim, 2015). It should be noted that controlling for nostalgia may also help to understand the mechanisms behind thinking like a child. The study performed by Ibrahim (2015) used child related objects (e.g. Play-Doh) for triggering nostalgia, however, in our view, this could in fact be inducing a childlike mindset and not a nostalgic state. On the other hand, the study performed by Zabelina and Robinson (2010) could have provoked nostalgic “mind travelling” when asking the subjects to imagine themselves as 7-year-olds. The question remains: is it the cognitive structure of childlike thinking, or is it the trigger of nostalgia that increments DT?

Having mentioned this, it will hold necessary to control for both these mediators in investigating the effects of Disney stimuli on priming child mindsets for enhancing DT.

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<sup>1</sup> On the other hand, although considered a “component of children’s culture”, it has been stressed that adults are also important consumers of Disney (Tranter & Sharpe, 2012). This being so, the fact that Disney persists in all its grandeur even in the adult world of today may eliminate the effect of nostalgia on encountering Disney related stimuli.

## Method

### Overview

The aim of the study was to experimentally test if exposure to Disney could lead to higher performance on a DT task. We hypothesize that this may happen due to priming a childlike mindset which has been shown to augment DT, however, the main study does not test explicitly for this mediation, but two pretests were carried out for the purpose of offering some clues on this, found in appendix B. Nevertheless, a control condition was used in the present study (Disney-disrupted) specifically designed to disrupt a childlike mindset, where adult-related thoughts are elicited (e.g. discussing payment of bills), to further explore this priming manipulation.

### Participants and Design

As the only similar study on priming “thinking like a child” and creativity did not report effect sizes (Zabelina & Robinson, 2010) we opted to look at effect sizes in studies for nostalgia and creativity (Ye et al., 2013) as well as for adult play and creativity (West et al., 2017) to calculate the appropriate sample size for the present study. Based on these<sup>2</sup>, a medium effect size was used, determining that 31 participants per cell would be required for  $\alpha=.05$  and  $(1-\beta)=.80$ , according to G\*Power. Thus, the number of participants for the experimental study would ideally range around 124. A total of 140 subjects initially participated, recruited by convenience through direct contact, as well as resorting to the snowball technique, however, 56 participants did not complete the study, 2 participants did not meet the determined age criteria and 1 participant responded in english. Hence, 81 Portuguese subjects (71.60% female), ranging from 18 to 45 years of age ( $M=25.78$ ,  $SD=5.66$ ) defined the sample of the study.

An experimental condition (Disney) and three control conditions (Disney-disrupted; Fox; No video) between-subject design was used, and subjects were randomly assigned to each condition through the Qualtrics online survey platform: 21 subjects were subjected to the

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<sup>2</sup> a medium effect size was used as the studies in question demonstrated a range from small effect sizes ( $\eta^2p = .03$ ; Ye, et al., 2013), to large effect sizes ( $\eta^2p = .18$ ;  $\eta^2p = .14$ ; West et al., 2017), and also as medium effect sizes are most frequently used in psychology research.

Disney condition, 24 to the Disney-disrupted condition, 16 to the Fox condition and 20 to the No video condition.

## Materials

### Opening Logo Video Clips

For priming a childlike mindset, the current CGI 30-second Walt Disney Pictures (henceforth, WDP) opening logo video clip was used as stimuli (figure 1). An opening logo was used as opposed to short film clips from WDP animation or live-action films for two reasons. Firstly, so that the subjects were not conditioned to a specific film or animation, and secondly, to stop any chance of creativity- which is abundant in WDP films - priming creativity or magical thinking enhancing creativity, which occurs when people are exposed to a magical or unnatural scene (e.g. elephants that fly, as seen in Disney’s animation “Dumbo”). Importantly, even if the WDP opening logo may remind us of Disney-magic features, the effect of magical thinking enhancing creativity has only been shown to occur when an actual magical scene is happening on screen<sup>3</sup> (see Subbotsky, Hysted & Jones, 2010). The WDP video clip was used for both the Disney condition and the Disney-disrupted condition.

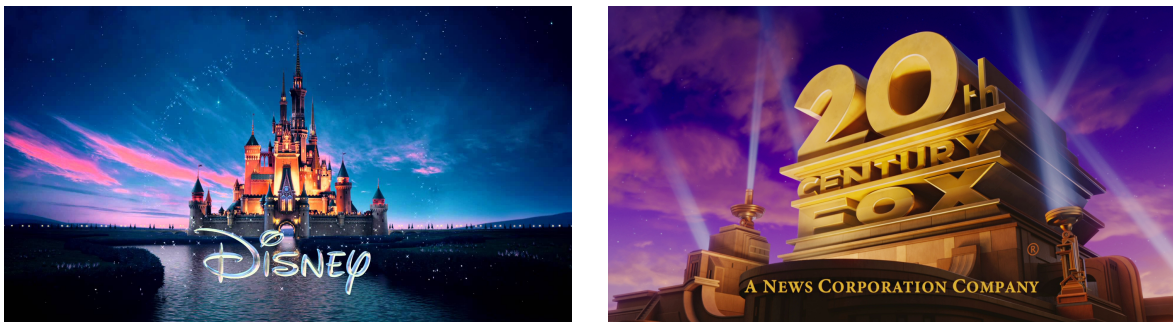


Figure 1. Screen shot of the WDP opening logo video clip (left) and the 20CF opening logo video clip (right).

Two pre-tests were developed in order to select a second opening logo video clip that would equal the WDP video clip in terms of actuality, duration, familiarity and mood induced, but would differ significantly in activating a childlike mindset (see appendix II). Nostalgia was also measured so that, ideally, the second opening logo video clip would also equal the

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<sup>3</sup> Children exposed to neutral Harry Potter video clips from the film Harry Potter and the Philosopher's Stone were less creative than those exposed to Harry Potter video clips from the same film but with magic happening on screen (e.g. flying on broomsticks) (Subbotsky et al., 2010)

WDP video clip in terms induced nostalgia. As all of the video clips, however, differed significantly in nostalgia to the WDP video clip, we tested for nostalgia in the present study for its use as a covariate. Thus, the current 20th Century Fox (20CF) opening logo video clip (figure 1) was chosen for the Fox control condition.

### **DT measure - AUT**

To assess participant's DT, the alternative Uses Task (AUT) based on Guilford (1967) was used, as it is the task which is typically (and widely) employed to assess DT (Radel, Davranche, Fournier & Dietrich, 2015). The AUT requires participants to come up with as many uses as possible for common household objects. Three objects which are widely used by the various researchers who also resort to this test (Chermahini, Hickendorff & Hommel, 2012; Chung, 2013; Karwowski et al, 2016; Radel et al., 2015), were chosen for the study: Brick, Newspaper and Empty drink can.

According to Guilford (1967), the AUT measures four outcomes (also commonly measured in other DT tasks): Fluency (the total number of responses given in the allotted time); Flexibility (the number of categories or groups of responses given in a set); Elaboration (The level of detail in responses); Originality (the level of uniqueness and novelty of the responses, either individually or as a set) (Puryear, Kuttler & Rinn, 2016). These four components, however, are often not employed in total when scoring for DT measures, which is the case of the present study, where elaboration was not measured as elaboration is often discarded when using the AUT as it is "difficult for untrained raters to score" (Runco & Acar, 2012, p.68).

### **Procedure**

Subjects were recruited by private message or public post via social media (Facebook and WhatsApp), where a hyperlink to the online survey platform Qualtrics was made available, and asked to share the link with their network contacts. The message and post informed that the survey was aimed at subjects whose age lay between 18 and 45 years of age, and requested that the survey should be completed on a computer or tablet but not on a smartphone (this was to avoid deformation of the video clips). Subjects were randomly assigned to one of the four conditions: Disney (D), Disney-disrupted (Dd), Fox (Fx) or the No video (NV) condition. Participants were initially thanked for their participation and informed

that they would be required to answer a few questions and perform a few tasks. Information on data confidentiality was also given, as well as the estimated time duration of the experiment (8 minutes).

The priming manipulation lay in the viewing of the video clips - subjects either viewed the WDP video clip (D and Dd), the 20CF video clip (Fx) or did not view a video clip (NV). Participants in the video clip conditions were asked to turn up the volume on their devices or to use headphones before watching the video clip. In the NV condition they answered an initial bogus question which asked to specify what sort of device the participant was using to access the survey, so as to allow Qualtrics to skip directly to the AUT in this condition. After viewing the video clip, participants were also directed to the AUT, except for the Dd condition, where they were first required to answer a few “adult questions” concerning their preferred forms of payment (money, credit card or debit card) of various services (e.g. a restaurant bill).

All subjects were then given instructions concerning the AUT. They were informed that they would be presented with ordinary day to day objects and were asked to come up with as many uses for each object as they could, in 2 minutes. Explicitly, instructions were given to “write everything that came to mind”. They were then directed to a separate page where the instruction “What uses could you give a (object)” appeared above a blank text box. The page had a visible 2 minute timer which initiated a countdown as soon as the page was loaded. When the timer reached 0, the participant was automatically redirected to a new page presenting a new object. All participants were presented with a total of three objects (Brick, Empty drink can and Newspaper). To subjects in the video clip conditions a final question on nostalgia was asked, where subjects were asked to describe how much nostalgia they felt when viewing the video clip (on a scale of 1 - Not nostalgic to 7 - Very nostalgic). Finally, subjects were asked to fill out demographic variables concerning age and gender and were thanked once more for their participation.

## Results

### Data Scoring

Responses which did not give a specific use for the object in question were eliminated (e.g. *atirar* (throw)). However, responses such as *atirar de cima para atingir alguém* (throw from above to hit someone) were accepted, as they suggest a use rather than the mere act of throwing). In total, 300 responses were generated for brick, 316 responses for can, and 398 for newspaper. Based on response categorization from Dippo (2013), responses which described the same use but were worded differently were then generalized into unique keywords (e.g. *Jogar à bola com a lata* (play ball with the can) and *objecto para jogar futebol* (object for playing football) were generalized to *Bola* (ball)). 66 unique keywords were identified for brick, 74 for can and 82 for newspaper, which demonstrated 66 different uses for a brick, 74 uses for a can and 82 unique uses for a newspaper (see appendix C: tables A4-A6). These were tested for facial validity by a group of 5 judges who expressed their agreement or disagreement relatively to the adequacy of the keyword and to which keyword each response should group into. For fluency scores, keywords generated by each participant for each object, were counted and totaled, so that each participant had a fluency score for each object (as done by Guilford, 1959).

Keywords were further categorized into type of function given to the object. Due to the diversity of response type (we *did* ask them to “write anything you can think of”!) it was not possible to maintain a single logic for differing and grouping keywords into categories. Instead, one of three different rules were applied, depending on the keyword in question. These were “properties of the object” (e.g. using newspaper for cleaning shoes: by using the *cleaning property* of newspapers), “things that may be physically done to the object” (e.g. using newspaper to make collages: by *cutting up* the newspaper), and “end to which the object is used” (e.g. using newspaper to sell it: *economic use*). For brick 17 categories were generated, for can 16 were generated and for newspaper 19 categories were found (see appendix C: tables A4-A6). All keywords were attributed to one category (e.g. *ler* (read), *atualizar-se* (become updated), and *procurar emprego* (look for a job) were all attributed to the *Conteúdo do Jornal* (Newspaper Content) category). Categories were tested for facial validity by the same group of 5 judges stated above, using the same method as with the

keywords. For each participant, response categories were summed, producing flexibility scores for each object (as done by Guilford, 1959).

Three frequency tables were created out of the generated keywords, separately for each object, where the percentage of occurrences for each keyword in the overall number of responses given was calculated. This provided us with the originality scores, where a low percentage of occurrence suggested higher originality. Unique answers were considered to be those which were given by less than or equal to 1% of the sample (as done by Puryear et al., 2017) (see appendix C: tables A7-A9). To each unique answer 1 point was attributed. Points were totaled for each participant for each object separately.

Uniqueness is supposed to reflect originality. Nevertheless, the uniqueness of some responses may also reflect a non adaptive, strange response, or even a more general abstract response. For instance, unspecific, vague responses (e.g. Can: *usar para jogos (used for games)*) were less frequently stated (and so, “unique”) than other more specific responses (*para jogar bowling de latas (to play can bowling)*). For this reason we opted for having a second originality score (which we will call originality II) where we asked three independent judges blind to the study hypothesis (two female and one male, with ages similar to the mean age of our sample) to rate the originality of each keyword, on a scale of 1 (Not Original) to 4 (Very Original) (as done by Karwowski et al., 2016). Inter-rater reliability was tested for, and due to good reliability for the three objects (Brick:  $\alpha = .85$ ; Can:  $\alpha = .82$  ; Newspaper:  $\alpha = .77$ ) scores of originality II were averaged for each of these.

In the end, we were left with three fluency scores, three flexibility scores, three originality I scores and three originality II scores (one for each object), for each participant. Finally, mean scores was calculated for overall scores of fluency, flexibility and originality I and II, for each participant. Higher scores in fluency, flexibility and originality meant a better performance.

### **General Performances**

Table 2 summarizes the mean fluency, flexibility and originality I and II scores for each of the three objects in separate and for the three objects together. As also seen in other studies which used newspaper as an object for the AUT (e.g. Ye et al., 2013), newspaper elicited the highest fluency, flexibility and originality I. Generally, originality II demonstrated

that the level of unique responses was low, seeing as the scale used for evaluating originality ranged from 1 (not original) to 4 (very original) and the mean score for originality II was below 2. For the other measures it is unclear if they follow the same pattern, as the scores used have no specific limits (like the scale used for originality II) and so we have no value to compare upon. Additionally, medium to strong correlations between objects suggest that DT performance across the three tasks was consistent for fluency ( $r_s=.49-.53$ ) and flexibility ( $r_s=.46-.56$ ), but for originality I this was only found for brick and can,  $r_s(79)=.43$ ,  $p<.001$ , whereas newspaper showed a small correlation to both objects, brick:  $r_s(79)=.32$   $p=.004$ , can:  $r_s(79)=.24$ ,  $p=.031$ . As for originality II, correlations between newspaper and brick,  $r_s(79)=.18$   $p=.119$ , and newspaper and can,  $r_s(79)=.11$   $p=.316$ , were not significant, and a small correlation was found between brick and can,  $r_s(79)=.24$   $p=.035$  (see appendix D: Outputs 1-4).

Table 2

*General performances across the three tasks (N=81)*

Object	Fluency	Flexibility	Originality I	Originality II
<b>Brick</b>				
M	3.70	3.16	0.83	1.60
SD	2.01	1.60	0.93	0.40
Minimum	1.00	1.00	0.00	1.00
Maximum	9.00	7.00	4.00	2.50
<b>Can</b>				
M	3.91	2.77	0.84	1.82
SD	2.01	1.26	1.10	0.34
Minimum	1.00	1.00	0.00	1.17
Maximum	10.00	6.00	4.00	2.75
<b>Newspaper</b>				
M	4.91	4.26	0.90	1.74
SD	2.42	1.88	1.00	0.37
Minimum	1.00	1.00	0.00	1.00
Maximum	11.00	9.00	4.00	2.92
<b>Overall</b>				
M	4.18	3.40	0.86	1.72
SD	1.77	1.30	0.72	0.25
Minimum	1.00	1.00	0.00	1.11
Maximum	9.00	7.00	2.67	2.28

Men scored higher in all measures (Fluency:  $M=4.50$ ,  $SD=1.70$ ; Flexibility:  $M=3.80$ ,  $SD=1.22$ ; Originality I:  $M=1.04$ ,  $SD=0.74$ ) compared to women (Fluency:  $M=4.05$   $SD=1.80$ ; Flexibility:  $M=3.24$   $SD=1.31$ ; Originality I:  $M=0.78$   $SD=0.71$ ), except for originality II (Men:  $M=1.71$ ,  $SD=0.26$ ; Women:  $M=1.72$   $SD=0.25$ ), although the difference between them was not significant for fluency,  $t(79) = -1.01$  ;  $p = .315$ ; *Cohen's d* = 0.23, flexibility,  $t(79) = -1.77$ ;  $p = .080$ ; *Cohen's d* = 1.57, originality I,  $t(79) = -1.49$ ;  $p = .141$ ; *Cohen's d* = 0.33, nor originality II,  $t(79) = 0.23$ ;  $p = .820$ ; *Cohen's d* = 0.06 (see appendix D: Output 5). Differences between mean scores for all measures also did not differ significantly between ages,  $F < 1$  (see appendix D: Output 6).

### Hypothesis testing

In order to test if exposure to Disney led to higher DT in the AUT, analysis of variance (ANOVA)<sup>4</sup> were carried out to compare means of fluency, flexibility and originality across the four groups - D, Dd, Fx, and NV (see appendix D: Output 7). These were carried out using the overall scores of fluency, flexibility and originality I and II for each participant. Results showed that there were significant differences between the groups for fluency,  $F(3; 77) = 4.17$  ;  $p = .009$ ;  $\eta^2 p = .14$ , as well as for flexibility,  $F(3; 77) = 4.26$ ;  $p = .008$ ;  $\eta^2 p = .14$ , but not for originality I,  $F(3; 77) = 1.40$ ;  $p = .25$ ;  $\eta^2 p = .05$ , nor for originality II,  $F < 1$ . However, and contrary to our hypothesis, participants in the D condition produced the lowest results across the three measures (except for originality I where they produced the second lowest) and surprisingly the Fx condition produced the most fluent, flexible and original thinkers<sup>5</sup> (see figures 2-5). Fx was also the only group to differ significantly from the other three groups for fluency (D:  $p = .001$ ; Dd:  $p = .007$ ; NV:  $p = .012$ ) and for flexibility (D:  $p = .002$ ; Dd:  $p = .003$ ; NV:  $p = .015$ ) (see appendix D: Outputs 8-9).

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<sup>4</sup> It goes to note that the sample does not meet analysis assumptions as it does not follow a normal distribution for scores of fluency,  $D(81) = .11$ ,  $p = .028$ , of flexibility,  $D(81) = .12$ ,  $p = .006$ , nor of originality I  $D(81) = .15$ ,  $p < .001$ . Only originality II was shown to follow a normal distribution,  $D(81) = .04$ ,  $p = 0.200$ . Nevertheless, non parametric ANOVAs (ANOVA on ranks) were run for all measures, as described by Marôco (2011), as it is an analyses which, by using rank-transformed data, is specifically designed for samples which violate the normality assumption, but not the homogeneity of variance assumption, which was the case in question. As shown in appendix D: Output 10, results for the ANOVA on ranks yielded the same results as the parametric tests, and so it was hence decided to use parametric tests for the remaining analyses, for having greater statistical power (Frost, 2017).

<sup>5</sup> Although non significant

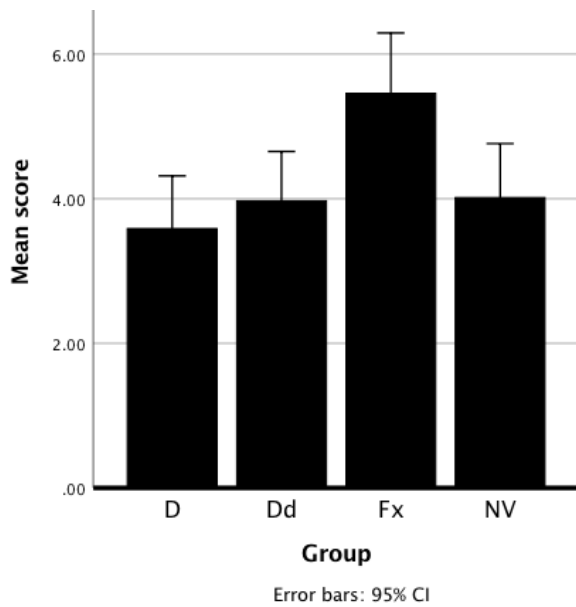


Figure 2. Mean scores for fluency for each group.

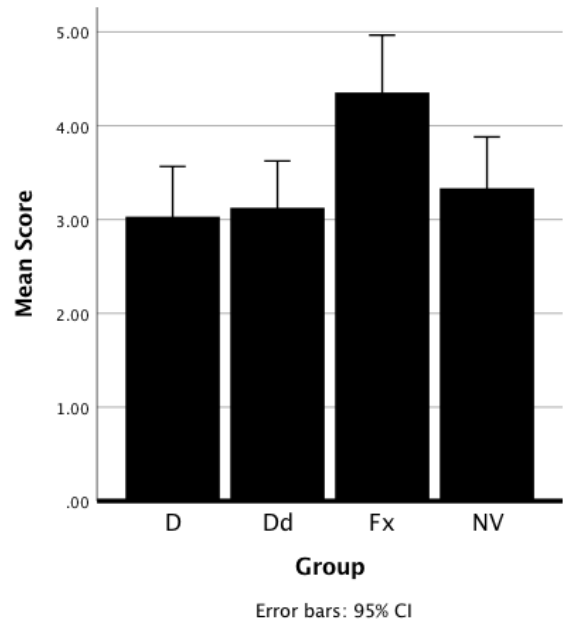


Figure 3. Mean scores for flexibility for each group.

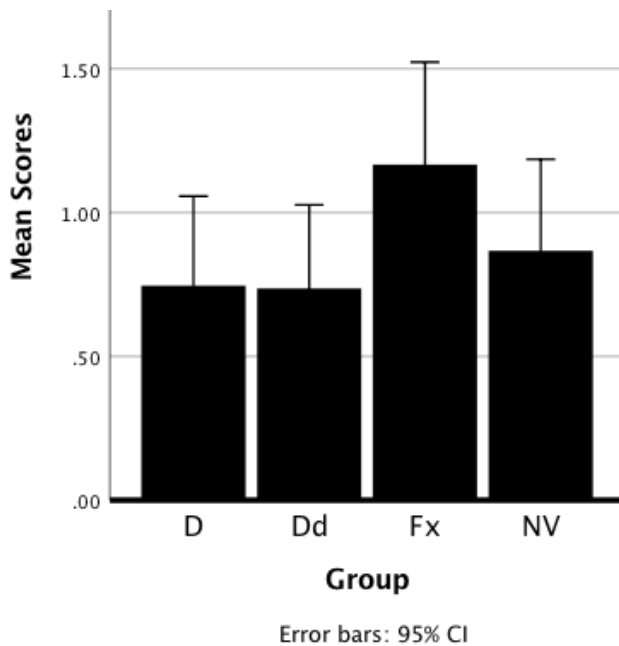


Figure 4. Mean scores for originality I for each group.

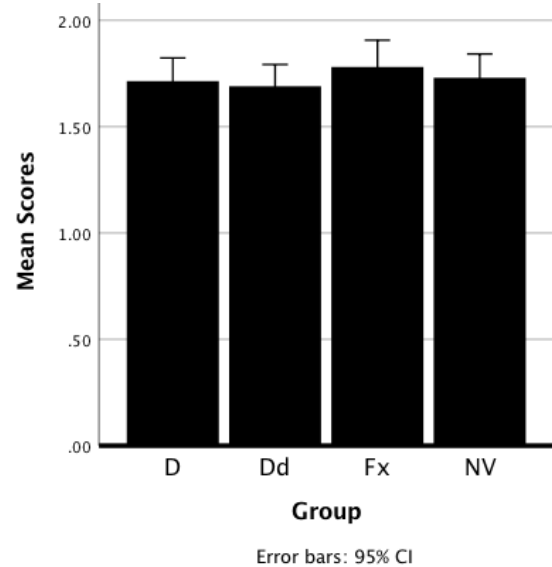


Figure 5. Mean scores for originality II for each group.

Because fluency may be exercising considerable influence on the flexibility and originality scores, seeing as the probability of producing more response categories or more original responses will be higher the more responses produced (fluency)<sup>6</sup>, correlations between the three measures were tested for, showing fluency to be highly correlated to flexibility,  $r_{s(79)}=.94$ ,  $p<.001$  as well as originality I,  $r_{s(79)}=.83$ ,  $p<.001$  (see appendix D: Output 11). As the overall score for originality II was calculated from mean scores of

<sup>6</sup> This is empirically demonstrated in a recent evaluation of the AUT (Dippo, 2013).

originality for each participant, it was not expected that fluency would strongly correlate to it, and this was demonstrated,  $r_{s(79)}=.47$ ,  $p<.001$  (see appendix D: Output 11). For that matter, analyses of covariance (ANCOVA) were generated for flexibility and originality I scores, controlling for fluency.

Controlling for fluency produced quite different results for originality I compared to the initial analysis, where the D grouped produced the most original uses, scoring slightly over the NV condition, and Fx the least (figure 6). For flexibility, controlling for fluency seemed to attenuate the effect found in the initial anova, decreasing the difference between means in Dd, NV and Fx, but increasing flexibility for D (figure 7). Nevertheless, no conclusions can be made as the differences between groups maintained non significant for originality I,  $F(3;76) = 1.36$ ;  $p = .261$ ;  $\eta^2p = .05$  and became non significant for flexibility,  $F(3;76) = 1.03$ ;  $p = .385$ ;  $\eta^2p = .04$  (see appendix D: Output 12).

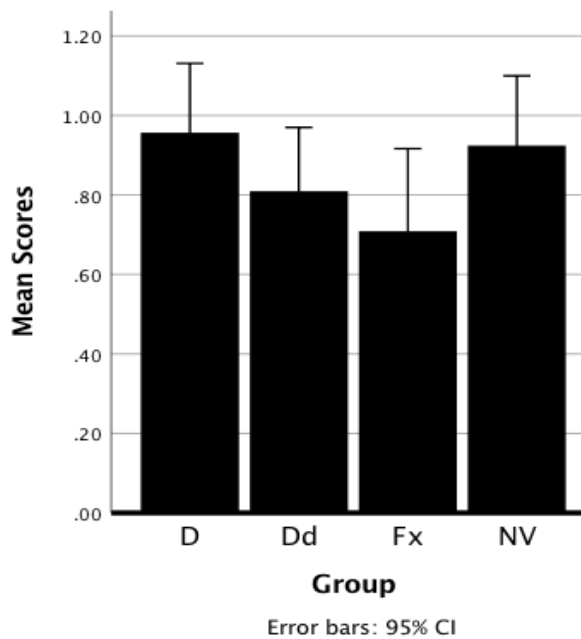


Figure 6. Mean scores for originality I while controlling for fluency.

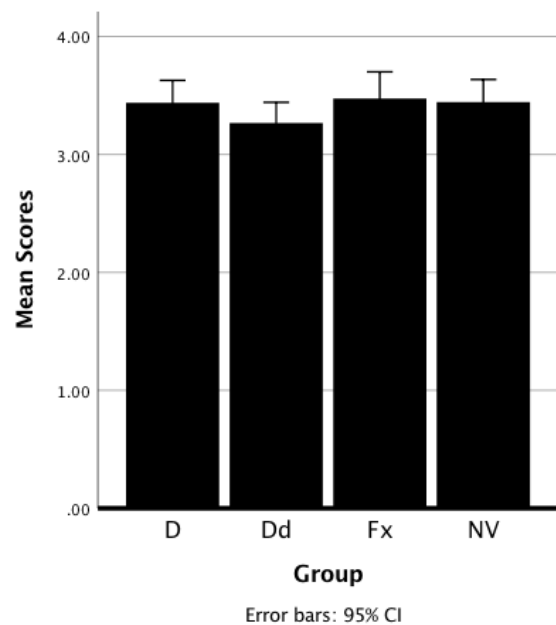


Figure 7. Mean scores for flexibility while controlling for fluency.

### The role of Nostalgia

Another aim of the study was to find if nostalgia as a covariate could account for the effect of the priming manipulation on the three measures of DT.

Firstly, groups were tested for differences in mean nostalgia scores. An ANOVA concluded that both the D ( $M=4.86$ ;  $SD=0.42$ ) and Dd ( $M=5.33$ ;  $SD=0.40$ ) groups (having

watched the same Disney movie clip) scored significantly higher in nostalgia than the Fx group ( $M=3.38$ ;  $SD=0.48$ ),  $F(2;58) = 5.22$ ;  $p = .008$ ;  $\eta^2p = .15$  (see appendix D: Outputs 13-14). There was no comparison to be made with the NV group as this was the group that did not watch a video clip and so participants were not submitted to the nostalgia question.

New ANCOVAs were run for the three measures while controlling for nostalgia. Nostalgia was not significantly related to any of the measures of DT ( $F<1$ , for fluency, flexibility and originality I.  $F(1;57) = 1.58$ ;  $p = .213$ ;  $\eta^2p = .03$ , for originality II) and so did not affect the results as was demonstrated when controlling for nostalgia on fluency,  $F(2;57) = 4.80$ ;  $p = .012$ ;  $\eta^2p = .14$ , flexibility,  $F(2;57) = 5.23$ ;  $p = .008$ ;  $\eta^2p = .16$ , originality I,  $F(2;57) = 1.70$ ;  $p = .192$ ;  $\eta^2p = .06$ , and originality II,  $F(2;57) = 1.24$ ;  $p = .298$ ;  $\eta^2p = .04$  (see appendix D: Output 15).

A second ANOVA was done to further explore whether nostalgia affected the DT measures by using the nostalgia scores as a fixed factor (ignoring the groups). Only fluency was relevant - although not achieving standard levels of significance,  $F(6;54) = 2.03$ ;  $p = .078$ ;  $\eta^2p = .19$  - as participants who had felt a low level of nostalgia (only significant for point 3 of the scale,  $M=5.83$ ,  $SD=0.70$ ) produced significantly higher scores of fluency than participants who felt greater levels of nostalgia, specifically for points 4 ( $M=3.20$ ,  $SD=0.77$ ,  $p=.014$ ), 5 ( $M=3.73$ ,  $SD=0.44$ ,  $p=.014$ ), and 7 ( $M=3.73$ ,  $SD=0.43$ ,  $p=.013$ ). All other measures were non significant (Flexibility:  $F(6;54) = 1.19$ ;  $p = .326$ ;  $\eta^2p = .12$  ; originality I:  $F<1$  ; originality II:  $F<1$ ) (see appendix D: Outputs 16-17).

## Discussion

The aim of the present study was to identify if priming a childlike mindset through watching the current 30-second WDP opening logo video clip would enhance DT on three measures - fluency, flexibility and originality.

Contrary to expectations, we found no significant differences between participants who had watched the WDP video clip when compared to the control groups as to their respective mean scores for flexibility and both mean scores for originality. More surprisingly was that watching the WDP video clip was shown to inhibit fluency to some extent, but to significantly enhance fluency on one of the control groups (Fx) who watched the 20CF opening logo video clip. These results differ substantially from the findings of Zabelina and Robinson (2010) who found that there was no influence of the childlike mindset priming manipulation on fluency scores but that participants who were primed for childlike thinking produced significantly higher levels of original responses than the control group.

Furthermore, WDP video clip viewers demonstrated significantly higher levels of nostalgia when compared to participants who watched the 20CF video clip. Bearing in mind that research has demonstrated that higher levels of nostalgia enhances performance in DT tests (Ibrahim, 2005; Ye et al., 2013), this was not replicated in our study, leaving us unable to speculate upon whether it is the cognitive structure of childlike thinking, or the trigger of nostalgia that increments DT. To a degree, fluency was partially affected by nostalgia, yet in the opposite direction - where high levels of nostalgia seemed to diminish fluency and low levels of nostalgia seemed to facilitate fluency.

At first glance our results demonstrate that exposure to Disney does not lead to greater DT, and suggest that it may even inhibit fluency. We may speculate, for that matter, that priming a childlike mindset does not appear to augment DT. However, such a conclusion is not possible to make, as alternative explanations of what may have occurred may be considered. Firstly, Disney may not have effectively primed a childlike mindset. On this topic, however, we can observe that there are slight differences (although not statistically significant) between mean scores for all measures in participants who were merely exposed to the WDP video clip and those whose thoughts were turned to adult-related thoughts (e.g. paying bills) immediately after watching the video clip - and so disrupting a primed childlike

mindset, further supported by findings in the pretests (see appendix B). Alternatively, exposure to Disney may have primed a childlike mindset but the task itself disrupted the effect. Secondly, exposure to Disney and Fox may have primed other concepts which we did not control for. Finally, aspects of the materials and measures used must be taken into consideration when discussing these findings, as well as other theoretical issues addressed below.

## **Walt Disney’s “Happily Ever After”**

### **Activation and Regulatory-Focus**

Used for its purpose as a childlike mindset primer for enhancing DT, WDP may not have been the most suitable option<sup>7</sup>. A recent exploration on the brand personality of The Walt Disney Company found that a majority of respondents considered Disney, with its family-friendly warm feelings (Jusufoska, 2012) and happy endings, to be “a place where you could escape your problems and your dreams could come true” (Winsor, 2015, p.24). While this certainly captures an essence of childlike thinking, it may be capturing a different aspect to the one we were aiming for. To explain, Zabelina and Robinson’s (2010) hypotheses and consequent findings are supported by the idea that it is the facet of child’s play, exploration and disinhibition that facilitate original thinking, and that it is this “spark of childhood creative thinking” (Zabelina & Robinson, 2010, p.58) that may be recaptured (primed) in adults. Disinhibition and freedom from constraints has been shown to increase fluency, flexibility and originality (Radel et al., 2015; Steidle & Werth, 2013) and facilitate problem solving on insight problems (Benedek, Panzierer, Jauk & Neubauer, 2017; Steidle & Werth, 2013). While Zabelina and Robinson’s (2010) priming manipulation consisted in having adults engage in thinking what they would do on a day off from school at age 7, priming an imaginary context of disinhibited freedom ideal for exploration and play<sup>8</sup>, our investigation had participants passively watch and immerse into the “Disney world”. This comfortable and

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<sup>7</sup> The use of Walt Disney Pictures could also have been precarious given that abundant creativity and *magic* is at the heart of Disney animations and films, increasing the risk of confounding results due to enhancing DT from exposure to creativity (Sassenberg, Moskowitz, Fetterman & Kessler, 2017) or magical content (Subbotsky et al., 2010) and not by activating a childlike mindset. Nevertheless, we explain why we believed this would not occur in our study when we discussed the Materials in the Method section.

<sup>8</sup> This was confirmed by the authors when analyzing the written protocols as the experimental group focused on aspects which encouraged spontaneous and playful thinking (i.e. playing with friends).

safe “place” (Winsor, 2015), where happily-ever-afters are commonplace, may in fact have hindered any motivation for exploration and, consequently, DT. Studies link behavioral activation - a system that causes a person to move towards a goal (Carver & White, 1994) - to creativity, clearly demonstrating that behavioral activation leads to more flexibility of thought as it stimulates individuals to “go beyond the information given” (De Dreu, Nijstad & Baas, 2011 p.73). Additionally, an investigation showed that when factors of comfort and cohesion were high in a group, performance in DT and idea generation was stifled and that performance of groups low in comfort was substantially better (Nemeth & Ormiston, 2007). In the same line, a meta-analysis of mood-creativity research demonstrated that positive mood states associated with a prevention focus and avoidance motivation, such as relaxation, led to lower fluency, flexibility and originality when compared with promotion focused and approach motivation mood states (Baas, De Dreu & Nijstad, 2008). These investigations suggest that we need a certain state of anxiety or “push” for DT to occur, giving reason to the idea that “comfort is where creativity comes to die” (The Drum, 2015).

Hence, it is possible that we may have primed an alternative childlike mindset - one that evokes warm, safe comfort, but stifles creativity - instead of a disinhibited, playful, explorative one which augments creativity. This may also give us some insight into the mechanisms of childlike priming on DT as found by Zabelina and Robinson (2010), indicating that it may be the behavioral activation, approach orientation and promotion focus components, which are triggered by priming play and exploration, that moderate this effect, also corroborating other research on adult play mentioned in the introductory section of this paper.

### **Honesty**

Another interesting aspect to speculate on is the association of the Disney brand to honesty and sincerity (Fitzsimons et al., 2008). Studies have shown that dishonesty is associated to creativity, where a higher creative personality or being primed to be creative is more conducive to dishonest behaviour in ethical dilemmas (Gino & Ariely, 2012), but more importantly for this study, that dishonesty has shown to lead to higher DT (Gino & Wiltermuth, 2014), showing a dark side of creativity (Gino & Ariely, 2012). This association is founded on the basis that dishonest behaviour and creative performance both share a

common factor: rule breaking or breaking barriers. Honesty is, by comparison, rule-bound and no trespassing of barriers (mental or otherwise) is involved. Hence, could priming honesty have a contrasting effect and inhibit DT? Exposure to the Disney logo has been shown to increase honest behaviour, which - we may reason - not unlike the negative effects of education on creativity, may lead individuals back onto predefined “correct” tracks, behaving inside the suitable structures and norms of society, and consequently diminishing the cognitive flexibility needed for DT.

### **Fluency and Nostalgia**

Participants who watched the WDP video clip reported higher levels of nostalgia compared to those who viewed the 20CF video clip, yet nostalgia did not aid in producing higher levels of DT as shown in literature (e.g. Ye et al., 2013). To a degree, nostalgia was even shown to decrease fluency. A recent study on nostalgia on consumer behaviour may aid in interpreting these results. Researchers found that nostalgia increased consumer patience (e.g. waiting in lines) due to the motivation of “slowing down” and savouring the triggered nostalgic memory (Huang, Huang & Wyer, 2016). This effect was shown to carry over onto non related tasks such as having more patience when waiting for a web page to refresh. If nostalgia motivates people to slow down in subsequent tasks unrelated to the nostalgic trigger, then WDP video clip viewers would have performed slower in the AUT (which followed the nostalgia trigger), writing down less uses for the objects and accounting for the low fluency scores. Low fluency would not, in this case, be attributed to a lower DT per se, but to a slower *physical* fluency (less uses physically written down in the allotted time), and maybe even ideational fluency, considering that nostalgia may even slow down thought process.

### **Global vs. Local processing**

Although our study hypotheses made no mention of the effects of viewing the 20CF video clip on DT, except for using it as a control condition, it would be interesting to speculate on reasons for its having produced significantly higher scores for fluency relatively to the other participants.

The Fox Film Corporation offers a tremendous variety of genres of film, from The Simpsons Movie to Die Hard, not to mention the assortment of broadcasted series and array of Fox channels. WDP, on the other hand, produces films which characterize a subset of films

produced by Fox: Family-friendly, live-action/animated films. While Disney constrains and specifies focus on its single film-type, Fox appears to widen or broaden a spectrum of focus due to its diverse offer. In other words, we reason that the present study might have primed broad and narrow focuses for Fox and Disney, respectively, which have been shown to influence creativity. For instance, a broad focus of perceptual attention was shown to lead to a broader focus of conceptual attention which increased scores in DT tests (Friedman, Fishbach, Förster & Werth, 2003). Additionally, investigations on global and local processing - the tendency to focus on general or specific characteristics and features, respectively - show that global processing facilitates creativity as opposed to local processing (Förster & Dannenberg, 2010; Förster, Epstude & Özelsel, 2009; Förster, Friedman & Liberman, 2004). The rationale behind these findings is that a global, broader scope of attention elicits more abstract, general, high-level construals but a narrower, local scope of attention elicits more concrete and specific, low-level construals (Förster et al., 2004). Using the illustration given by the authors, if one was to list reasons for why you would greet someone, DT would benefit from abstract thinking, as the generation of high-level construals such as “way to socialize” or “gesture of communication” would offer more diverse responses than concrete focusing, where low-level construals such as “waving the hand” would be elicited. That said, we may have unintentionally restricted thought process for the Disney viewers by activating a more local processing, putting up boundaries instead of taking them down through childlike thinking, whereas we may have produced satisfactory conditions for the Fox viewers to score high on fluency due to a widening of attention scope and activation of a more superordinate abstract level of thought.

Interestingly, global processing has also been linked to the above mentioned behavioral activation and cognitive flexibility (De Dreu et al., 2011) as well as to a promotion focus (Förster & Higgins, 2005) which facilitate DT, whereas local processing has been associated to a prevention focus.

### **Limitations**

We cannot overlook certain methodological limitations of the present study.

First and foremost, the size of our sample was not what we intended it to be. Also, the 30 participant per cell rule of thumb was violated, where subjects ranged around 20 per

condition, except for one of the groups which had only 16 subjects. As similar studies to ours (such as Ye et al., 2013) demonstrated small effect sizes, it would deem necessary for the use of a large sample size in order for an effect to occur, which may explain why our results did not follow our hypothesis.

The reason behind our small sample size is also a point for reflection. Although 140 participants started the survey, 56 quit halfway through. Also, most of these participants successfully completed the task for the first object of the AUT, and only then did they quit. Certain survey features have been identified to impact the degree of motivation of respondents (see review in Dillman, 2011), one of them is that tasks which are more burdensome produce less responses (Kaye & Johnson, 1999). The AUT may be considered as burdensome, as subjects are required to think of not one but various solutions to a problem which goes beyond normal day-to-day thoughts, and to write these down while suffering external pressure from a countdown clock shown on screen. While participants aim to exert the least amount of effort possible - when even performing one more mouse click has been shown to decrease motivation (Conrad, Couper, Tourangeau, & Peytchev, 2006) - our study is particularly prone to producing low motivation in participants. It is unclear then if the participants that were tested were representative of the population, as we may have only captured participants already intrinsically motivated to complete tasks of this nature, such as individuals high in creative personality. In Zabelina and Robinson's (2010) study they found that certain personality traits interacted with the manipulation of a childlike mindset. In extroverts and subjects open to experience, thinking like a child was shown to produce little effect on creativity, whereas in high levels of introversion priming manipulation produced the highest effect. This is because individuals high in extroversion and openness to experience usually possess a spontaneous style of thinking, similar to that of the child (Zabelina & Robinson, 2010). Also, openness to experience and extroversion are personality traits which have been largely shown to relate to higher creativity on diverse measures (Ee, Seng e Kwang, 2007; Puryear et al., 2016; Puryear et al., 2017; Silvia, Wigert, Reiter-Palmon & Kaufman, 2012; Zhou, 2003). Hence, if our sample only captured the motivated "creatives" (individuals high in openness to experience and extroversion), this may in part explain our contrary-to-hypothesized data and results. On the other hand, our general

performance data show that average scores of originality are low in our sample which would suggest that our sample was not made up of participants with high level of DT ability.

The wording of the AUT instructions may have had some part in this. Researchers have advanced that it is essential to *instruct* participants to provide answers that are creative, producing a higher creativity sample for a more valid indicator of individual differences on DT (Ye et al., 2013). Our task simply asked participants to write down everything that came to mind, and made no mention of creativity.

Another aspect worth taking into account is that for originality I and II scores, correlations demonstrated that scores were not consistent across the three tasks for the different objects, namely newspaper was shown to produce higher scores when compared to alternative uses for a brick and a can. This may suggest that either newspaper is an easier object to find original alternate uses for, when compared to brick and can, or that participants got better at originality as they progressed through the tasks. In light of this, it would have been pertinent to randomize the order in which objects appeared to participants so as to analyze if in fact the objects themselves could have influenced the results or if originality becomes better with practice, suggesting that we should have presented one or two trial tests of the AUT before participants completed the actual AUT task.

As mentioned, DT is only one component of creativity. Other creativity tests differ in the sense that the focus is either on the person that creates, the process or the actual creative outcome or production, and may even differ in terms of methods of evaluation, as well as who should evaluate (for a review see Hennessey, Amabile & Mueller, 2011). It has been shown that investigations that intend to replicate certain effects on creativity with another creativity measures at times fail to do so. For instance, a study which showed that drinking a glass of wine improved performance in the Remote Associates Test (measuring convergent thinking ability), also demonstrated to have no effect on the AUT (measuring DT ability). Thus, each single creativity measure may “accurately tap one or more creative abilities or predispositions” (Hennessey et al., 2011, p.254) leaving other abilities unexplored. That said, the fact that our results were unsuccessful, does not necessarily indicate that our hypothesis is incorrect concerning creativity. It may be that the employment of another measure of creativity could in fact capture the effect of the priming manipulation, as predicted. For

instance, a theoretical analysis discusses the merits of childlike thinking for effective insight/problem-solving (another creativity indicator), due to focus on surface similarities (Indurkha, 2013).

### **Conclusion and Future Directions**

Our findings did not follow the direction of our hypothesis, but did shed some light on priming a childlike mindset through exposure to Disney, as well as the effects of nostalgia on fluency. Also, the lack of promising results concerning the effect of Disney on increasing DT through priming a childlike mindset should be interpreted in light of the limitations and theoretical issues we discussed in this section of the paper.

Future research should focus on identifying the mechanisms that underlie the effects of childlike thinking on creativity, as shown by Zabelina and Robinson (2010), to grasp a fuller understanding of this effect, according to activation and regulatory focus theories, which we only advance theoretically. Furthermore, isolating priming a childlike mindset from nostalgia would be beneficial to further comprehend what we failed to uncover: if it is the cognitive structure of childlike thinking or the trigger of nostalgia that increments DT. It would also be interesting to explore if a childlike mindset can enhance insight problem-solving, as the mechanism underlying this type of creative process relies on focusing on perceptual and surface similarities, which is an intrinsic ability of young children (Indurkha, 2013). The interest here would not only be to investigate if a childlike mindset may facilitate other creative abilities besides DT, but it would also be useful in providing further clues to the components of childlike thinking which influence creativity, besides play. Additionally, future studies should consider constructing and validating a measure of childlike thinking, based on what we feebly attempted to do in pretest II, to ascertain that certain primes are effective for this specific purpose.

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## Appendix

### Appendix A - Literature Review

#### **Creativity: How we may all be creative**

As demands any investigation, the concepts used must be clearly defined for an appropriate variable measure and comprehension of the study. Nonetheless, a clear, unanimous definition of creativity as a scientific term has been, unsurprisingly, quite difficult to put together (Kampylis & Valtanen, 2010). When thoughts turn to creativity, words such as “different”, “new”, “novel” and “original” may come to mind. In fact, during the 1950’s through to the early 70’s, creativity researchers, scholars and laypeople seemed to hold a semi-unanimous view of creativity, where it was defined as the ability to produce novel and appropriate ideas or works - a gift bestowed upon the lucky talented or “geniuses” (Amabile, 2012). The idea that the creative individual possessed some sort of special qualities, turned a great empirical focus on personality traits that provided creativity, especially after Joy Paul Guilford’s renowned discourse<sup>9</sup> to the American Psychological Association (Rhodes, 1961). Some of the studies that emerged sought to identify creative potential and talent in individuals (e.g. Gough, 1979), and searched for differences in personality traits between creative groups of individuals (such as successful architects) and their not-so-accomplished peers (e.g. MacKinnon, 1965).

Observing these studies, anyone who has not been born with “the gift of creativity” might as well admit defeat in hope of any sort of successful creative endeavour.

However, we may breathe a sigh of relief as another current of studies brings back hope to these individuals, taking notice of contributions from social environment that were largely ignored in creativity research (Amabile, 2012). Social Psychologist Teresa Amabile, after observing discordant factors of the creative trait-talent genius theory, and acknowledging that “there is virtually no research on the social psychology of creativity”(Amabile, 1983, p. 357), ventures into this field putting situational and contextual factors into the picture, and investigating their interaction with personality characteristics and cognitive ability. Some of the conflicting factors that triggered this change in focus were: a) the possibility that

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<sup>9</sup> "In its narrow sense, creativity refers to the abilities that are most characteristic of creative people" (Guilford, 1950, p. 444).

creativity could be a learned and practiced skill, b) the observation that the so-called creative geniuses had fluctuations (or “good” and “bad” days) in their creative productions and, consequently, that c) situational factors could enhance or inhibit creative behaviour (Amabile 2012).

Along with this, the focus on creativity gradually shifted from the predominant Big C (eminent) Creativity (which investigates creative geniuses, much like the studies of MacKinnon (1965), as described above) to everyday, little c creativity (Kampylis & Valtanen, 2010). Little c creativity describes the creative products and ideations of the average person in a normal daily task (e.g. finding a way to recover a key which has fallen into a sewage gutter or finding a solution to when there is no more toilet paper in the stall that you are in)<sup>10</sup>. The acknowledgment that these activities are also a form of creativity was fundamental to appreciate their value and importance (Kaufman, & Beghetto, 2009).

Faced with these notions of little c creativity - which concerns us all - and that contextual factors may enhance or inhibit creativity, the obvious question springs to mind: How *does* creativity happen and what influences it?

The examples of influences on creativity in research are substantial and of the most varied form. Motivation, for instance, is shown to influence creative behaviour, where intrinsic motivation increases creativity but extrinsic motivation - such as external rewards (e.g. money) and deadline threats - decreases creativity (Amabile, 2012). Illumination has also shown to have an impact on creativity. One study showed that creating a dimly illuminated environment improved undergraduates creative performance on insight problems, compared to a brightly lit environment (Steidle & Werth, 2013). Conversely, participants who performed an insight task by the light of a lamp with a visible light bulb (an iconic image/metaphor of insight) solved the problem more often than participants working in a room illuminated by a fluorescent overhead light (Slepian, Weisbuch, Rutchick, Newman & Ambady, 2010). In yet another study, movement was shown to affect creativity, where subjects who walked on a treadmill indoors or who walked around outside produced more creative outcomes than participants who were sitting down.

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<sup>10</sup> This can actually be easily achieved with a wire hanger. In relation to retrieving the fallen key, that is. Definitely not as a suitable tool for resolving the paperless bathroom issue.

## **A Definition of Creativity**

The complex nature of this concept is probably the reason behind an inexistent universal definition of creativity. Nevertheless, reviews and other attempts at generating a standard definition of creativity are able to shed light on the key features of this concept.

A recent review on creativity definition and conceptualizations gathers forty-two explicit definitions for the scientific term of creativity found in journal articles, books, open-access databases and academic databases since 1950, where analysis identifies four key components which are agreed upon by the vast majority of these authors: a) Creativity is a key ability of *individuals*, b) it presumes an intentional *activity*, c) it occurs in a specific *context* and d) it entails the *production* of a novel and appropriate tangible or intangible product (Kampylis & Valtanen, 2010).

Curiously, these four components mimic what was initially introduced in the literature by Rhodes (1961) as the 4 P's. The idea of creativity as the 4 P's (person, process, product and press) entails a global view of creativity, where facets such as environmental factors, temperaments and mental processings are taken into consideration when alluding to creativity, as no single component alone may explain it (Rhodes, 1961). Creativity, then, reflects the event of an individual's (person) mental activity (process), which results in conveying a new concept (product) inserted in a social context (press).

Along the same line, Plucker et al. (2004) identify recurring themes and elements in the diverse definitions of creativity in scientific journals, serving as basis for a definition of their own: "Creativity is the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context" (Plucker et al., 2004, p. 90).

Importantly, two common dimensions - novelty and appropriateness - have been overwhelmingly agreed upon by most researchers as essential to be considered "creative" (Feist, 2010; Plucker et.al., 2004). Novelty and appropriateness seem to go hand-in-hand, as an idea or product that is "new" is not a sufficient condition for creativity, it must also be useful and/or produce meaning or value.

## Measuring Creativity

Determining how to measure creativity has also had its diversity and disagreement in psychological research. For a concise overview of the diverse creativity measures and tests, the most practical form of organizing these measures may be by fitting them into an imaginary table with two axis, where on one axis they differ in terms of creative ideation-potential tests or production-achievement tests, and on the other differ in terms of self reported tests or externally rated ones (as done by Puryear et al., 2017). Measuring productions as a creativity test is quite self-explanatory. These tests are mainly used to measure quality of creative outcomes (e.g. the Creative Achievement Questionnaire; Carson, Peterson, & Higgins, 2005) and quantity of creative outcomes (e.g. the Creative Behavior Inventory; Hocevar, 1979), focusing on ones creative achievements. Contrarily, the creative ideation-potential measures do not assess the actual creative product per se, but rather are a measure of what *might occur* when faced with other creative endeavors (the potential to be creative). These tests mostly involve demonstration of skills (e.g. in divergent and convergent thinking tasks) or outright questioning of frequency of ideation per day (e.g. the Runco Ideational Behavior Scale; Runco, Plucker, & Lim, 2001). The question of who is the best judge for these tests is also a hot topic in current creativity research. The Consensual Assessment Technique (also a creative product test; Amabile, 1982), for instance, employs external raters for multiple areas of expertise in the task at hand, while the Creative Behavior Inventory uses a self-report method.

### **Divergent Thinking (DT)**

To think divergently is to possess the ability to produce a variety of responses, solutions and/or ideas, which extend beyond the given information (Guilford, 1959). To an extent, it may be comparable to the overly used metaphor to think-outside-the-box. As discussed very briefly in the above paragraph, divergent thinking (DT) measures are creative potential tests. That is to say, these tests estimate the *potential* for creative thinking to occur (Runco & Okuda, 1991) - they are mere *indicators* - which is something quite different from assuming that DT is the same as creative thinking (Runco & Acar, 2012). An indicator serves as a predictor, where there is always some degree of uncertainty associated, which means that

a DT task may reliably<sup>11</sup> predict future creative performance, but that creative performance may or may not occur (Runco & Acar, 2012). It is highly important to stress and clarify this point as DT measures have been often erroneously employed or referred to as creativity tests due to their popularity in creativity investigation domains over the years (Nicholls, 1972; Runco & Acar, 2012).

DT tests typically address four “abilities” (Guilford, 1959): Fluency; Flexibility; Originality and Elaboration. Take the following example of a possible DT instruction: “In three minutes list everything that comes to mind that is round and edible”. For the *fluency* score the investigator would resort to the number of solutions given by the participant. To assess *flexibility* the number of categories or classes in which the number of solutions could be fit into would be considered. For instance, a participant who jotted down “chocolate, Malteser, M&m, Ferrero Rocher, chocolate almond, chocolate bonbon” may total a fair score for fluency (6), but as they all fit into one category (chocolates/candy) the participant would score low for flexibility compared to someone who wrote down “chocolate, orange, cucumber slice, overweight person (if I were a cannibal or extremely hungry)”, as all the responses fit into distinct categories (candy; fruit; vegetable; person). The second participant may also find their *originality* score to be higher than the first participant, as originality is the generation of unique, statistically infrequent responses (compared to responses from the given sample of participants). It would be most unusual if the response “overweight person” were to appear frequently in other participants’ answers. The same response may also earn a point for this participants’ *elaboration* score, which is the amount of detail contained in the response. Different scores of elaboration would be given to the mere response of “overweight person” (little amount of detail), “overweight person (if I were a cannibal)” or “overweight person (if I were a cannibal or extremely hungry)” (a good deal of detail).

These four components, are often not employed in total when scoring for DT measures. For instance, elaboration is often discarded. However, caution must be taken in deciding which measures to use, so as not to taint the reliability and validity of the tests. It is proposed in literature that the measure of fluency should not stand solo as a measure of DT

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<sup>11</sup> As evidenced by Runco & Acar, 2012

(Runco & Acar, 2012). Flexibility and originality, for instance, are more closely linked to creativity than fluency.

### **Priming**

Theorists have proposed that individual knowledge is structured within a cluster of nodes linked together to form semantic networks in the brain so that memory retrieval occurs through spreading activation of these nodes - representative of a specific concept - and links (Collins & Loftus, 1975). In other words, when we perceive the word “bread” we are quicker to recognise or recall words like “butter” than unrelated words like “nurse” as the nodule relating to “bread” is activated and this spreads activation of nodes linked to it, causing these related concepts to be made more accessible in our memory.

The explanation for the subtle effects of priming in semantic memory can be found in this spread of activation theory, where items currently attended to (the priming stimuli) can elicit certain available memories through spreading of activation from the primed node (Collins & Loftus, 1975). When primed, the activated concept in memory spreads activation to associated concepts, facilitating the recall of these concepts by exterior input in following unrelated tasks, for some time thereafter. For instance, in an experiment, participants who were asked to identify if presented letter strings were words or non-words had quicker reaction times (a facilitation indicator) when they were shown pairs of associated words such as BREAD-BUTTER or NURSE-DOCTOR than when they were shown unassociated words such as BREAD-NURSE (Meyer & Schvaneveldt, 1971).

Initially known as “perceptual readiness”, the cognitive mechanism of priming is the activation of an internal cognitive representation which impacts on subsequent behaviour by increasing its accessibility and, consequently, the probability of it being used (Dennis, Minas & Bhagwatwar, 2012; Smith & Mackie, 2007). Like ripples on a pond, primed ideas may also prime other concepts, while declining in strength of accessibility (Kahneman, 2011). A large array of studies, validated across a variety of domains, document the effects of priming and its influence on individual behaviour, attitudes, beliefs, motivations and goals through activation of mental representations which underlie the desired behaviour, attitude, belief, motivation or goal (Dennis et al., 2012; Bargh & Chartrand, 2000). For instance, in a landmark study for social psychology, participants who were exposed to the personality trait “adventurous”

formed more positive impressions of Donald - a fictional character who was described through ambiguous behavioural information - than participants who had been primed with the trait “reckless”, in a seemingly unrelated task (Higgins, Rholes & Jones, 1977). In another investigation - an analysis of voting patterns in Arizona - it was shown that people who’s polling station was located at a school tended to vote more for propositions to increase school fundings than voters from other voting locations (Berger, Meredith & Wheeler, 2008). In yet another classic experiment where students were asked to create sentences from sets of words, participants who were given sets made up of elderly-related words - e.g. “gray”, “bald”, “forgetful”, “wrinkle” - walked out of the experimental room and down the corridor significantly slower than other participants (Bargh, Chen, & Burrows, 1996).

The truly fascinating component of the priming mechanism, and its key factor, is that we are quite unaware of this occurrence in our behaviour and judgments ( Kahneman, 2011; Tulving & Schacter, 1990). That being so, participants are usually oblivious to the intention of the stimuli that is presented in investigations which use this research “tool”. From the time since the “priming effect” was empirically demonstrated (and coined!) by Segal and Cofer (1960), researchers have employed priming as an experimental technique with the purpose of delving into the passive and unintended influences of the recent surrounding context in our day-to-day lives (Bargh & Chartrand, 2000). These have mainly used two types of priming - subliminal and supraliminal.

Supraliminal priming occurs above the threshold of conscious perception and alludes to the subjects awareness of a presented stimuli, though not of its true investigational intent (Dennis et al., 2012). In an investigation on category accessibility and social perception (Srull & Wyer 1979) where a supraliminal prime was used, participants were asked in a first task (the priming task) to underline three words from four-word sets, that would make up a sentence. The words conveyed either hostility or kindness, turning the desired category accessible.

Subliminal priming happens below the threshold of conscious perception and refers to a brief presentation of stimuli, masked immediately by another stimulus, and hence not taken consciously into awareness. For instance, in a study on persuasion, subjects were instructed to focus on a target point on a computer screen and identify if flashing letter strings were words

or nonwords (Strahan, Spencer & Zanna, 2002). The aim of the study, however, was to prime the participants in the experimental condition with thirst. Thirst-related words, like “dry” and “thirst”, would appear for 16ms each in the parafoveal field (far from the focusing point mentioned above) simultaneously to the word-nonword identifying task that was occurring in the focus point. The subliminal prime were then masked by a series of x’s which appeared in the exact same spot as the priming words for 102ms, so that participants were unaware of the subliminal priming words. Although a weaker manipulation, subliminal priming may effectively aid to rule out other possible explanation for a priming effect, and so is frequently employed to validate the significant effects of supraliminal priming (Bargh & Chartrand, 2000). Research has shown that manipulation of non-conscious cognition has a large influence on human behaviour and that, importantly, most of human behaviour occurs through non-conscious cognition (Dennis et al., 2012).

### **Priming Mindsets**

Although initially focusing on semantic primes - the use of verbal material to activate semantic networks within the brain - current literature presents us with a variety of priming techniques which fit under the widespread umbrella of priming research (Bargh & Chartrand, 2000).

Generally, the aforementioned priming investigations have all had one common factor - the priming element is embedded in an initial “priming task”, which is made to seem completely unrelated to the task where the priming effect is expected to take place, in a passive non-obtrusive way, emphasizing its purpose of mere activation of the desired concept. To illustrate, in the Donald experiment (Higgins et al., 1977), the presentation of the word “adventurous” or “reckless” (priming stimulus) precedes that of the seemingly unrelated task of forming an impression of Donald where the priming effect is observed, due to the concept that has been primed (e.g. forming a positive impression of Donald if primed with the word “adventurous” or forming a negative impression of Donald when primed with the word “reckless”). This is said to be Conceptual priming (Bargh & Chartrand, 2000).

Mindset priming, however, has a slightly different approach to Conceptual priming. A mindset refers to a specific knowledge structure or cognitive operation that facilitates a given task, and which - by its very nature - is also susceptible to activation through priming (Torelli

& Kaikati, 2009). What essentially differentiates mindset priming from conceptual priming is that procedures are being activated rather than concepts, which also explains why it is sometimes called procedural priming (Förster, Liberman & Friedman, 2009). In fact, literature in social psychology has demonstrated that it is possible to manipulate mindsets on a short term basis, which in turn influence behaviour and judgments on unrelated subsequent tasks (Zabelina & Robinson, 2010). In general, participants are firstly led to engage actively in the procedure which is expected to “carry-over” on to subsequent tasks (Bargh & Chartrand, 2000), as the mere activation of the representation is not what is targeted, but its particular use. For instance, counterfactual thinking (Galinsky, Moskowitz, and Skurnik, 2000) approach and avoidance motivation (Higgins, 1997), abstract or concrete thinking (Torelli & Kaikati, 2009), distrust (Kleiman, Sher, Elster & Mayo, 2015) and even creativity mindsets (Sassenberg & Moskowitz, 2005) have been demonstrated to be effectively primed in this manner and interfere with following tasks. These investigations carried out experimental procedures such as asking participants to write down thoughts that would occur to them when winning/losing a trip to Hawaii through a randomly drawn seat number at a concert, after having just changed their seat (counterfactual thinking mindset; Galinsky et al., 2000), to think of how one’s actions relate to one’s ultimate life goals or how ultimate life goals can be expressed through specific actions (abstract or concrete mindset; Torelli & Kaikati, 2009), and even to briefly describe situations in which they had behaved creatively (creativity mindset; Sassenberg & Moskowitz, 2005).

Social psychology has effectively and largely demonstrated that it is possible to prime conceptually and procedurally. Despite this, literature also demonstrates that what distinguishes both of these priming techniques is, at times, blurry (Förster et al., 2009). In a study where either an accuracy or an impression-management mindset was activated through manipulation (Chaiken Giner-Sorolla & Chen, 1996), participants were instructed to read a text depicting an individual who was either preoccupied with accurately understanding a specific situation or concerned with making a good first impression. The fact that the method used in this study did not instruct participants to pursue in the wanted thought procedure, but engaged them in a passive experience for the same effect, goes to show that mindsets may also be primed through other techniques which resemble more passive conceptual priming methodologies. What’s more, researchers have argued that the distinction between conceptual

and mindset priming is not that clear, declaring that these activation processes may occur simultaneously and impact information processing in separate ways. (Förster et al., 2009; Bargh & Chartrand, 2000; Smith, 1994)

### **Think like a Child**

With the cry for creativity that arises in the XXI century world of innovation and entrepreneurship, various priming methods have been used and investigated to enhance individual and group creativity, be it in the workplace, classroom or laboratory. The ability to increase creativity has been demonstrated through using contextual primes (e.g. dim lighting: Steidle & Werth, 2013; creative virtual environments: Bhagwatwar, Massey & Dennis, 2013), motivational primes (e.g. promotion focused leaders: Wu, McMullen, Neubert & Yi, 2008), attentional primes (e.g. broad scope of perceptual attentional: Friedman, Fishbach, Förster & Werth, 2003) and even priming creative mindsets (Sassenberg et al., 2017), to name only a few.

However, the search for effective creative primers seems to have skipped over one of the most touted “recipes” for creativity we know. In the words of Piaget, “if you want to be creative, stay in part a child, with the creativity and invention that characterizes children before they are deformed by adult society.” (as cited in Kets de Vries, 2012, p.26).

### **Children and Creativity**

Literature has referenced time and time again how children can be “remarkably creative” (Runco, 1985, p.177), how “every child might be described as creative” (Urban, 1991, p.177) and how there seem to be “similarities between artistic creativity and children” (Sawyer, 2003, p.3). The factors that explain this superior creativity in young children have also been explored. Research has demonstrated that early childhood provides a strong search for newness and knowledge, a natural “inherent curiosity” proper for this age, manifested in “early drawing productions, expressing feelings and experiences, early language, curiosity, (...) questioning (...), role playing, and construction” (Urban, 1991, p. 178), where creativity is undoubtedly brimming. Children’s impulsive manner is also a facilitator of creativity, which theorists link to spontaneity and low self consciousness (Zabelina & Robinson, 2010). In addition, Vygotsky (2004) asserts that the processes of creativity are fully manifest in early childhood, observed through their play (e.g. “A child who

sits astride a stick and pretends to be riding a horse”, p.11). This is closely linked to DT patterns, as children reinterpret common objects and turn them into novel ones (Holmes et al., 2017).

The realization that mature creativity might stem from early childhood (Fuchs-Beauchamp, Karnes & Johnson, 1993) arises from research concerning the development of creativity from young children to older children and adults. Numerous findings show that creativity wanes with age and life experience (Torrance, 1968; Gardner, 1982; Dacey, 1989). Specifically, preschoolers seem to hold a high creative potential (Urban, 1991), which seems to become lost in slightly older children (Cropley, 2001). Three phases of creativity development, coined the preconventional, conventional and postconventional years (Rosenblatt & Winner, 1988), are explained on the basis that children up to the ages of about 6-8 (preconventional stage) produce novelties in a spontaneous, non stereotyped fashion, lacking biases from experience, but children in the conventional stage (6-8 to 10-12 years of age) conform to rule-bound thinking, norms and structures, diminishing creative production. In the postconventional stage (from 12 years of age onwards) creativity is higher than in the conventional stage, as older children and adults may opt to reject conventions, even though they are aware of them (unlike children in the preconventional stage) (Cropley, 2001). However, even though the postconventional stage holds necessary elements for highly creative thinking, the fact that there is awareness of external constraints and rules is in itself a barrier for free and fluid DT.

In one longitudinal study (Land & Jarman, 1992), 5 year olds were given creativity tests constructed to measure DT. Out of the 1600 preschoolers who took the test, an astounding 98% scored in the highly creative potential range. The same children took the creativity test when they were 10 years old, again when they were 15 and once more at the age of 23. Surprisingly, instead of demonstrating that they grew better at DT as they grew up into mature adults, a significant decrease in the percentage of children scoring in the highly creative range was shown, culminating in only a mere 2% of the over-23's scoring as “highly creative”. It is only natural that we ask ourselves: what happened along the way?

The finger has often been pointed at the educational system. Although children demonstrate astoundingly creative and innovative capacities, it seems they are being educated

out of it as they grow up (Robinson, 2006). The reason children are so creative may be attributed to the simple fact that they “see the world with fresh eyes” (Vint, 2005) - where no preconceived boundaries and filters hold back free thinking, exploration and experimentation - whereas schools and education in general guide us back on to predefined tracks. We stigmatize mistakes, teach that there is always a right or wrong answer, and essentially narrow down the view (Robinson, 2006; 2010). Education drives conformity and creativity is unlearned. In the longitudinal study by Torrance (1968) a decrease in creativity is shown in children aged around 6 - the age where children usually start school - due to conforming to school norms and authorities, as well as peer pressure (Claxton, Pannells & Rhoads, 2005). In addition, criticisms to school curricula have pointed out the detrimental effects of inhibiting play and how that affects natural creative potential (Sawyer, 2003). In a similar line of research, Gardner (1982) holds that the development of creativity follows a U-shape pattern, where high artistic creativity can be found in very young children but declines when these children begin school and have to conform to educational structures. Gardner (1982) noted that creative ability seemed to increase once more in preadolescence and through adulthood, albeit influenced by life experiences and learned skills (Claxton et al., 2005). It is without a doubt that adulthood, in its premeditative and cognitively controlled form, comes with a series of upsides (Zabelina & Robinson, 2010), however, these same benefits may prove to diminish creative thinking, as the “adult world” is laden with rules, routines and structures which in turn bound out-of-the-box thinking.

### **Childlike Mindset Priming and Creativity**

Very few research has focused on augmenting creativity through using child-related primers or by manipulating a childlike mindset. However, one research clearly demonstrates that thinking like a child may facilitate creative performance. Zabelina and Robinson’s (2010) enlightening investigation managed to prime a childlike mindset in university students by asking them to imagine themselves as 7-year-olds. The researchers in question were “unaware of manipulations seeking to facilitate a childlike mindset”, seeing as - to the author’s knowledge - no such manipulation has been documented before their investigation or, for that matter, repeated after it. Nonetheless, “this mindset [proved] amenable to a priming manipulation” (Zabelina & Robinson’s, 2010). The participants were asked to imagine that school was cancelled for the day and exhorted to write about what they would “do, think and

feel in such a situation”. In the primed condition the prompt ended with “You are 7 years old”, which was the only difference from the experimental to the control condition. To measure DT, participants were subjected to the Abbreviated Torrance Test for Adults (ATTA) which is a short version of the Torrance Test of Creative Thinking (TTCT), a highly used DT measure that uses a battery of verbal and figural tests which prompt participants to generate a response from a given stimulus (such as requiring participants to draw a picture from incomplete figures). The abbreviated ATTA only uses three of the tests from the TTCT and scores for fluency and originality. The results demonstrated that the students primed with a think-like-a-child mindset produced significantly more original outcomes in the ATTA, than their peers. The results demonstrated that the students primed with a think-like-a-child mindset produced more creative original outcomes in the ATTA than their peers.

There have sprung other (yet few) research that link creativity to what may be considered as childlike elements and features. Playfulness has been one of these explored elements. Findings have demonstrated that the trait of playfulness in adults is connected to higher self reports of creativity (Bateson & Nettle, 2014; Proyer & Ruch, 2011), and that priming playfulness through role playing games (Karwowski & Soszynski, 2008) and creating a playful workplace setting (West et al., 2017) leads to increased creative performance. Even simple play cues such as offering sweets at a meeting has been shown to “signal that play is permissible” (West & Hoff, 2016, p.78), and increase a meeting’s creativity climate. In an investigation which labeled the same puzzle task<sup>12</sup> as either work or play (Glynn, 1994), results demonstrated that more creative sentences were produced in the play task condition. Interestingly, one of the words used for the puzzle task, which consisted in creating sentences out of words, was DISNEYLAND, and this proved to be one of the words that elicited the highest numbers of responses, longer sentence length and higher vocabulary variability ratio (number of different words/total number of words), in *both* the work and play task. This could indicate that the word “Disneyland” may inherently induce creative processing in spite of the context that is set.

Additionally in a theoretical analysis, although lacking in empirical testing, the merits of childlike thinking for effective problem solving (another creativity indicator) are discussed,

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<sup>12</sup> The puzzle task consisted of creating sentences out of words. e.g. ORGANIZATION could produce sentences such as NAT RAN TO A ZOO

due to surface similarities (Indurkha, 2013). Surface similarities are an aspect of childlike thinking which refer to the tendency young children have to categories based on perceptual/surface (e.g. colour, shape) similarities. Many problem-solving puzzles and also the nature of real life creative problem solving rely on surface similarities to reach a solution, thus, as we grow older and develop functional, structural and other semantic similarities, it is harder do abandon these structures and turn to the simpler - and effective - childlike ones. The author states that “focusing on surface similarities provides one mechanisms to go back to the pre-structure stage, so that alternative structures can be found” (Indurkha, 2013).

In other areas of research, such as design, childlike thinking for creativity has also been empirically tested. Through tweaking traditional childhood games to create original design ideation games, it was demonstrated that adult participants who were led to engage in these games (e.g. musical chairs, duck duck goose) - and so primed with a childlike mindset - produced more creative design ideas than participants who had not been primed (Nestok, 2016).

## **Controlling for other Creativity-Enhancing Primers**

### **Nostalgia and Creativity**

Few studies have probed the effects of nostalgia on creativity, however the ones that have dedicated themselves to this area of research have found promising results that the state of nostalgia does increase creativity (Ibrahim, 2015; Ye et al., 2013). Subjects led to write about a nostalgic experience, performed better in a alternative Uses Task (AUT), producing more DT than a control group (Ye et al., 2013). The findings in this study also show that the *state* of nostalgia, induced by priming, accounted for the results, but the same cannot be stated for the *trait* of nostalgia in subjects. In another experiment, presenting participants with olfactory cues that were pre tested to induce “mental time travel” (e.g. Play-Doh) was shown to facilitate creative thinking in a problem-solving task - the “Duncker Candle Problem” (Ibrahim, 2015). According to the authors, the results of these studies are rooted in the effects that nostalgia have on the way people think but not, as could be contrary supposed, the way they feel.

Nostalgia has been described as a complex and "bittersweet" emotion, which “refers back to an earlier period in the individual's life and draws on biased or selective recall of past

experiences” (Havlena & Holak, 1991, p.323), where the individual feels “mildly sad as a result of remembering one's happiness in past situations” (Johnson-Laird & Oatley, 1989, p. 117). Naturally, a bittersweet emotion is not all there is to nostalgia, as it is “a cognitive activity that evokes active retrieval and connection of memories” (Ye et al., 2013, p.317), where there is a “mental journey” back in time (Suddendorf and Corballis, 1997). When “mentally travelling back in time” the contents of the past that are retrieved usually contain some falsities. That is, nostalgic thoughts of “the good old days” may induce distorted perceptions “rather than reflecting the true nature of the past” (Leboe & Ansons, 2006, p.596). This cognitive activity reflects similarities to counterfactual thinking, as it involves considering events inconsistent with reality (Drayton, Turley-Ames & Guajardo, 2011). Counterfactual thinking has been shown to enhance creativity (e.g. Sternberg & Gastel, 1989) by providing the basis for “generating imaginary possibilities in creative cognitions and insightful thinking” (Ye et al., 2013, p.318). Also induced by nostalgia, this direct change in thinking may be an explanation for the increase in DT.

Furthermore, one investigation demonstrated that “nostalgic memories serve as a reservoir of creativity” (subjects would use information collected from episodic memories as basis for generating new ideas in the AUT) but also that nostalgia enhances networks in the brain which facilitates creative performance (Ye et al., 2013, p.318).

Also, the feeling of nostalgia increases psychological well-being (see review in Ye et al., 2013), which in turn may also be the cause of increased creativity, as reasoned in the following section (Mood and Creativity). However, it is important to note that in the aforementioned investigations the emotional charge of nostalgia did not affect creativity, whereas this enhancement was attributed to the cognitive process of nostalgia, as findings report that the amount of text written on the nostalgic experience was a contributor to creative performance but the positivity of what was written was not (Ye et al., 2013). In the same sense, findings also show that the interaction between smell and valence on the feeling of mental time travelling was not significant (Ibrahim, 2015)

### **Mood and Creativity**

The relationship between affect and creativity has received considerable attention in research, although often producing conflicting results. Positive affect, for instance, has usually been attributed to influencing higher creativity, as it leads to generation of more unusual or original responses (Isen et al., 1985; Lewis et al., 2011), facilitation on insight tasks (Isen, Daubman & Nowicki, 1987) and convergent thinking (Rowe, Hirsh & Anderson, 2007), but the contrary has also been shown to happen (see review in Hennessey & Amabile, 2010), for instance where positive states such as relaxation led to lower creativity when compared with negative mood states such as anger (Baas et al., 2008). A study which focused on different concepts of positive affect (e.g. humour, surprise) on creativity demonstrated how the contradicting results in this area of research may be explained due to viewing positive affect as a unitary phenomenon, as they found arousal or activation to be a necessary condition for positive affect to influence creativity (Filipowicz, 2006).

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## Appendix B - Pre Tests

### Overview

Two pre-tests were developed for two reasons. First, in order to select a second brand for an opening logo video clip that would equal the Walt Disney Pictures (WDP) opening logo in terms of actuality, duration, familiarity, mood induced and nostalgia, but that would differ significantly in relation to being childlike or associated to “child”, for use in the control condition. Secondly, to shed some light on the question of the WDP opening logo effectively priming a childlike mindset.

### Pre-test I

#### Subjects

6 participants from an MA classroom at ISPA - Instituto Universitário de Ciências Psicológicas, Sociais e da Vida in Lisbon (5 MA students and their tutor) were addressed and asked for their participation in a short questionnaire.

#### Materials

Seven different still images of opening logos of brands from different major film production companies were used for participant evaluation. Using WPD as the reference point (see figure A1), the remaining six companies were chosen for also belonging to the “eight Golden Age majors”. These were: 20th Century Fox (20CF), Columbia Pictures (CP), Metro-Goldwyn-Mayer (MGM), Paramount Pictures (PP), Universal Studios (US) and Warner Bros (WB) (see figure A2).

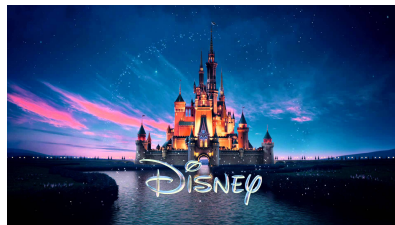


Figure A1. Still image of WDP opening logo.



Figure A2. Still image of several opening logos of major film brands: (from left to right) 20th Century Fox, Columbia Pictures, Metro-Goldwyn-Mayer, Paramount Pictures, Universal Studios and Warner Bros.

## Procedure

In a classroom, subjects were asked to view the seven images of opening logos which were projected individually on a screen and, for each image, to write down on paper how much they considered the opening logo was familiar (on a scale ranging from 1 - not familiar to 7 - very familiar), how much nostalgia they felt on viewing the image (on a scale ranging from 1 - not nostalgic to 7 - very nostalgic) and how much they considered the opening logo was associated with either children or adults (on a scale ranging from 1 - child to 7 - adult). For this last point, the aspect of the film producers' association either with children or adults was left purposely vague so that the subjects would form their own criteria of reasoning without conditioning them to specific aspects (e.g. producers of family-friendly films). Each image was only shown once and the subjects were requested to write down their answers as the images were shown. The answers were collected at the end and the participants were thanked.

## Results

Means were calculated for each of the three measures (familiarity, nostalgia and child-adult association) of each image (see table A1). Higher scores meant higher nostalgia, familiarity and higher association to adult. Importantly, it was verified that the WDP opening logo demonstrated a high association to child as opposed to adult, comparatively to the means of the remaining brands.

Table A1

*Mean scores for Nostalgia, Familiarity and Child-Adult association*

	20CF	CP	WDP	MGM	PP	US	WB
Familiarity	6.67	4.83	5.83	6.00	5.50	5.33	6.50
Nostalgia	3.50	2.83	5.17	5.70	3.33	3.50	5.33
Child-Adult A.	5.00	4.17	1.33	4.17	5.17	4.50	3.17

To identify brands which equaled the WDP brand in terms of mean induced nostalgia and familiarity and distanced themselves in term of mean association to either child or adult, a score of Distance-from-WDP-mean was calculated for each measure (see table A2). The calculation considered that higher scores for familiarity and nostalgia meant a smaller distance, but the inverse occurred for child-adult association, where higher scores meant a larger distance of means. We also took into account the different pertinences of each measure in the actual study, thus, we attributed different weights to the measures according to what we believed to be the order of importance of each one: firstly, the child-adult association, followed by nostalgia and finally by familiarity. Overall final scores are shown in table A2.

Table A2

*Distance-from-WDP-Mean Calculation for Nostalgia, Familiarity and Child-Adult association*

	20CF	CP	WDP	MGM	PP	US	WB
Familiarity	2.00	1.00	-	5.00	2.00	4.00	6.00
Nostalgia	4.00	1.00	-	6.00	5.00	4.00	3.00
Child-Adult A.	5.00	2.00		2.00	6.00	4.00	1.00
<u>With weights</u>							
Familiarity (1)	2.00	1.00	-	5.00	2.00	4.00	6.00
Nostalgia (2)	8.00	2.00		10.00	4.00	8.00	12.00
Child-Adult A. (3)	15.00	6.00		6.00	18.00	12.00	3.00
Total	25.00	9.00		22.00	27.00	24.00	18.00

Note: (1) familiarity was attributed a weight of \*1. (2) nostalgia was attributed a weight of \*2. (3) child-adult association was attributed a weight of \*3, according to order of pertinence for the study.

## Discussion

The aim of the pretest was to identify two major film production brands that would distance themselves considerably from the WDP brand in their association with child or adult,

and would resemble the logo in familiarity and nostalgia. The three film production brands with the highest Distance-from-WDP-mean scores were chosen for pretest II: PP, 20CF, and UP. However, PP was excluded from the final set as pretest II used opening logo video clips instead of still images and PP's opening logo video clip was substantially shorter than the rest of the set.

## **Pre-test II**

### **Subjects**

A total of 60 Portuguese subjects (78.3% female), ranging from 18 to 37 years of age ( $M=22.35$ ,  $SD=3.41$ ), participated in the experimental study. The participants were recruited by convenience through direct contact, as well as resorting to the snowball technique.

### **Materials**

Two opening logo video clips of the chosen brands from pretest I (UP and 20CF) as well as the WDP opening logo video clip were used as stimuli for pretest II. The pretest was done on the Qualtrics online survey platform, due to efficiency purposes.

### **Procedure**

Subjects were recruited by private message or public post via social network (facebook and whatsapp), where a hyperlink to the Qualtrics online survey platform was made available, and asked to share the link with their network contacts. Participants were initially thanked for their participation and asked to turn up the volume on their devices or to use headphones before starting the survey. Subjects were randomly assigned to watch one of the three opening logo video clips: WDP (18 participants), UP (20 participants) or 20CF (22 participants). After viewing the video, participants were asked to rate the feeling of nostalgia (on a scale ranging from 1 - not nostalgic to 7 - very nostalgic), positive/negative mood (on a scale ranging from 1 - positive mood to 7 - negative mood) and familiarity (1 - not familiar to 7 - very familiar) they experienced while watching the video. The order of these three questions were counterbalanced for each participant. At last, subjects were asked to pause for 1 minute and to imagine that they were "back at school", that school was cancelled for the

day and to imagine what they would be doing, thinking and feeling during that day<sup>13</sup>. On a different page, subjects were requested to write down in years the age in which they had just imagined themselves. Finally subjects were asked to fill out a few demographic variables (age, gender), asked if they had experienced any technical difficulties during the course of responding to the survey, and were thanked once more for their participation.

## Results

Means for familiarity, mood, nostalgia and imagined age are summarized in table A3 for each of the video clips. As hoped, ANOVAs showed that differences were not statistically significant between means of familiarity,  $F < 1$ , and means of mood,  $F(2,57) = 1.380$ ;  $p = .260$ ;  $\eta^2p = .046$ , for the three video clips. For nostalgia, however, results were not as positive, as differences in mean levels of nostalgia felt in the three video clips was proven to be significant,  $F(2,57)=5.040$ ,  $p=.010$ ,  $\eta^2p =.150$ , and that it was the WDP video clip who differed significantly from the other two clips (UP:  $p=.005$ ; 20CF:  $p=.011$ ). It was decided that in the actual study nostalgia would again be measured to function as a covariate in the analyses.

Table A3

*Means for familiarity, mood, nostalgia and imagined age for each video clip.*

	<u>WDP</u>		<u>UP</u>		<u>20CF</u>	
	M	SD	M	SD	M	SD
Familiarity	7.00	0.00	7.00	0.00	6.86	0.64
Mood	6.11	1.28	5.40	1.35	5.73	1.32
Nostalgia	6.00	1.14	4.30	1.95	4.50	2.06
Imagined Age	11.11	4.34	14.75	2.97	14.41	5.22

Most enlightening was that videos also differed significantly in their mean imagined age,  $F(2,57)=4.094$ ,  $p=.022$ ,  $\eta^2p =.126$ , markedly WDP was, once again, the only video clip to differ significantly from UP,  $p=0.12$ , and 20CF,  $p=0.19$ , and produced the lowest mean

<sup>13</sup> This was adapted from Zabelina and Robinson's (2010) priming instruction. Whereas the authors explicitly told people to imagine themselves as 7year olds, we tried to invert this so that we could get a sense of the childlike priming effect that watching the WDP video clip may have on adults, and the possibility of analyzing this quantitatively.

imagined age (see table A3). Frequency charts show that 67% of participants who watched the WDP video clip reported imagined ages ranging from 8-12 years old (50% between 8-10), and had imagined ages reaching as low as 5 and 6, suggesting that the WDP opening logo video clip may be effective in priming a childlike mindset (Figure A3). Comparatively, UP triggered a majority of imagined ages between 14-17 years old (85%) (Figure A4), and 20CF responses showed that participants imagined themselves spread out in a much wider spectrum of ages, from 5 to 25 year olds, where the mode imagined ages were 15 and 16 years old (27%) (Figure A5).

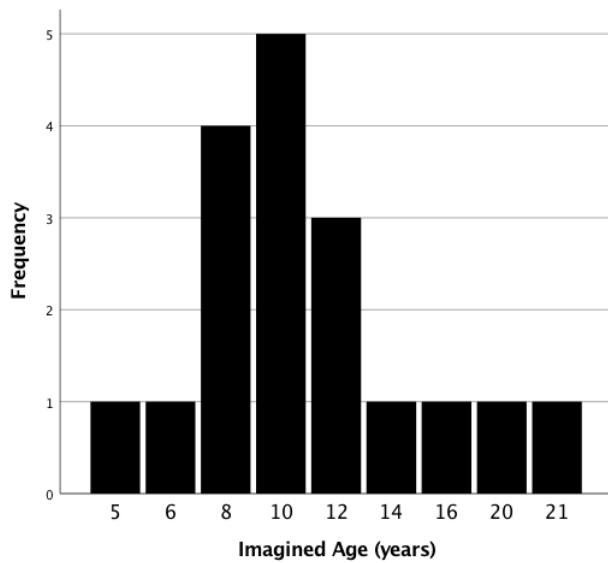


Figure A3. Frequency chart of imagined ages for WDP

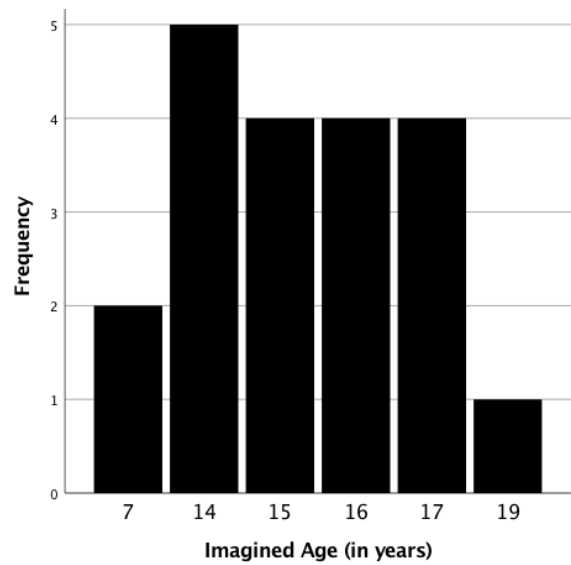


Figure A4. Frequency chart of imagined ages for UP

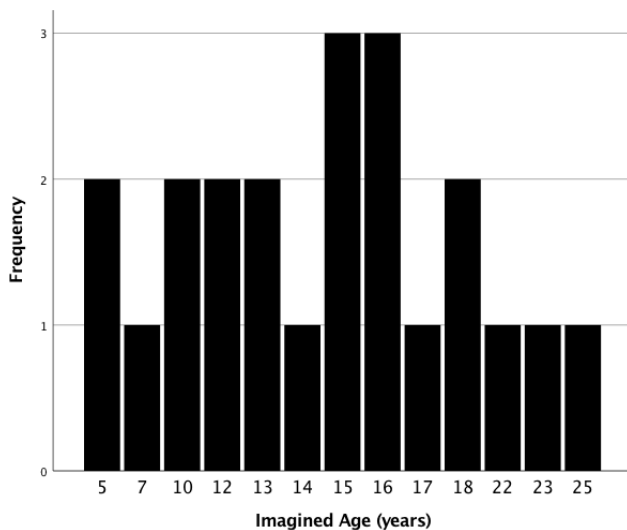


Figure A5. Frequency chart of imagined ages for 20CF

## **Discussion**

The aim of the pretest was twofold: to shed some light on the question of WDP's opening logo priming a childlike mindset, as opposed to UP or 20CF opening logos; and to opt for one of the two opening logos (UP or 20CF) for the actual study, based on their likeness to the WDP's opening logo in mood, nostalgia and familiarity and differentiation in imagined age of the "no school" scenario.

As means in nostalgia differed significantly in the three video clips it was important to single out the video clip whose mean score showed the value closest to the WDP opening logo as requirement for being selected for the study. Thus, the 20CF opening logo video clip was chosen to be used in the study, seeing as the mean score for nostalgia was closest to that of the WDP video clip, even though the UP video clip mean imagined age was farthest from that of WDP.

## Appendix C - Data Scoring

**Table A4**

Keywords grouped into Categories for Brick

<u>Brick</u>			
Keywords	Categories	Keywords	Categories
Banco	Altura	Mesa	Pequena Construção
Degrau		Chão	
Suporte/apoio		Canteiro	
Calço		Monte	
Apoio para os pés		Bricolage	
Decoração	Aparência	Consertar	
Peça de Arte		Prateleiras/estante	
Paisagismo		Garrafeira	
Candeeiro		Competição de Lançamento do Tijolo	
Vaso flores/plantas	Compartimentos	Arma de arremesso	Peso
Separador de objectos vários		Agredir alguém	
Casa para Bicho da Seda		Para partir algo	
Suporte de Tubos		Martelo	
Oração de Taizé		Esmagador de Batata para fazer puré	
Fita métrica	Comprimento	Pisa-papéis	
Para construir Edifícios e estruturas	Construir	Peso (geral)	
Sistema de Drenagem de água		Levantar Pesos	
Pirâmides		Contra-peso	
Abrigar		Âncora	
Para dividir/barreira/criar espaços	Criar espaços	Comer (em forma de gomas)	Reinterpretação
Fazer tinta	Desconstrução	Usar como resposta de uma adivinha	
Fazer barro (derretendo)	Económico	Capa de Telemóvel	Resistência
Vender/ganhar dinheiro		Prova de Karaté	
Brincar	Material para jogos	Caixa muito forte	Anti-fogo
Fazer um carro de brincar		Lareira/Fogueira/Churrasco	
Fazer um Jogo		Cozinhar	
Jogos de Rua		Base para quentes	
Pistas de Carros		Para desenhar/riscar	Cor
Decorar e fingir que é um animal	Objecto estático	Brita	Cacos
Alvo (de pressão de ar/tiro)		Ricochete na água com bocados	
Base		Partir em pedaços para atirar ao cão	
Tapar buracos			
Assinalar algo (e.g. Balizas)			
Cunha para a porta			
Separa-Livros			

**Table A5***Keywords grouped into Categories for Can*

<u>Can</u>			
Keywords	Categories	Keywords	Categories
Agredir alguém	Agressão	Base para copos (parte de baixo)	Recortar Material
Saltos Altos	Altura	Medalhas (com a parte de baixo)	
Andas		Escamas de Peixe	
Coluna		Bijuteria	
Coleccionar anilhas	Anilhas	Copiar chaves	Recriar Forma
Usar anilhas para Bijuteria		Mini Prato	
Usar anilhas para fazer duplo-cabide		Brinquedo (geral)	
Decoração	Aparência	Presépio	
Arte Moderna		Casinha de Bonecas	
Candeeiro		Fantoches	
Castiçal		Regador	
Copos vintage		Funil	
Calçada	Deformar	Marco	Ser cortante
Reciclar	Desconstruir lata	Telefone	
Tiro ao Alvo	Objecto estático	Trabalhos Manuais	
Bowling		Objecto cortante	
Porta Chaves		Utensílio de Cozinha (e.g. ralador)	
Tapar buracos		Bola	Ser redondo
Demarcar Balizas		Rolamentos	
Jogos de Criança/campos de férias (geral)		Dado	
Modelo para desenhar		Roda	
Coleccionar	Carrinho	Som do Material	
Copo para Material Escolar	Suporte de Elásticos		
Vaso/jarra	Carrinho de Rolamentos		
Cinzeiro	Instrumento Musical		
Copo/Guardar líquidos	Recipiente	Espanta Espíritos	Transportar
Caixa para Guardar Objectos		Prender a um carro para fazer barulho	
Mealheiro		Afastar Pássaros das Colheitas	Anti-fogo
Lixo		Estojo	
Copo para escovas de dentes		Carteira	Isolamento térmico
Suporte para palhinhas		Vela	
Canteiro para especiarias		Camping gas/Fogão	
Guardar Gelo		Chaleira	
Aquário		Botija de água	
Fazer gelatina			
Jarro			
Cinzeiro de praia			
Suporte para a colher de pau			
Recipiente para conservar comida (cereais)			
Caixa de bombons			

**Table A6***Keywords grouped into Categories for Newspaper*

<u>Newspaper</u>				
Keywords	Categories	Keywords	Categories	
Leque	Abanar	Colagens	Recorte	
Abanico (acender fogueira)		Moldura		
Decoração	Aparência	Recortes		
Cortinas		Recortar letras para escrever cartas de amor/ uma mensagem		
Guardar a forma dos sapatos/malas	Deformar (amachucar)	Confettis		
Enchimento para caixa de presentes		Jogo de Palavras		
Enchimento de almofadas		Recriar Roupas		
Bola (para jogos)	Deformar (amachucar) para rolar	Trabalhos Manuais		Recriar forma
Papier Machê	Desconstruir jornal	Chapéu/barco/avião		
Reciclar		Origami (geral)		
Vender	Económico	Candeeiro		
Embrulhar presentes	Embrulho	Flores de papel		
Embalar objectos para viajar		Pulseiras		
Proteger objectos frágeis		Roupa para o Carnaval		
Embrulhar (geral)		TV de brincar		
Embrulhar comida		Construir uma cesto/caixa		
Folha de Rascunho	Escrever	Envelope	Rolo	
Folha para desenhar		Taças		
Tela	Forrar	Matar moscas/insectos		
Proteger superfícies de tinta/obras		Bater em alguém		
Papel de Parede		Bater no cão quando se porta mal		
WC para animais		Rolo		
Forrar cadernos/livros		Bastão de “Basebol” com bolas de ping-pong		
Forrar		Bastão para estacionar carros		
Forrar Caixas/gavetas		Megafone (tubo)		
Tapete		Isolamento térmico		
Cama para os animais		Isolar tenda do frio e humidade		
Individual		Cobertor		
Base para lixo	Limpeza	Limpar vidros		
Bases para tachos		Limpar (geral)		
Capa		Papel Higiénico		
Capa de Telemóvel		Puxar o lustre		
Cobrir		Limpar o carro		
Forrar almofadas		Atear fogo/ acender lareira		
Forrar assentos		Toalha		
Fundo de uma gaiola de pássaros		Secar sapatos molhados		
Toalha de praia		Fazer os Passatempos		
Chapéu para a praia		Protecção	Ler	Conteúdo
Cobrir a cabeça da chuva	Actualizar/informar			
Suporte de Castanhas	Recipiente	Guardar noticia como recordação		
		Pensar		
		Procurar Emprego		

**Table A7***Frequency of occurrences of keywords for Brick*

<u>Brick</u>					
Keywords	Freq.	%	Keywords	Freq.	%
Para construir Edifícios e estruturas	74	24.67	Âncora	1	0.33
Banco	23	7.67	Apoio para os pés	1	0.33
Degrau	15	5.00	Base para quentes	1	0.33
Suporte/apoio	15	5.00	Brita	1	0.33
Pisa-papéis	14	4.67	Caixa muito forte	1	0.33
Mesa/“Pernas”	11	3.67	Candeeiro	1	0.33
Arma de arremesso	11	3.67	Canteiro	1	0.33
Decoração	11	3.67	Capa de Telemóvel	1	0.33
Lareira/Fogueira/Churrasco	10	3.33	Casa para Bicho da Seda	1	0.33
Bater em alguém/matar alguém	9	3.00	Chão	1	0.33
Vaso flores/plantas	7	2.33	Comer (em forma de gomas)	1	0.33
Base	6	2.00	Competição de Lançamento do Tijolo	1	0.33
Calço	6	2.00	Consertar	1	0.33
Fazer tinta	6	2.00	Decorar e fingir que é um animal	1	0.33
Peso (geral)	6	2.00	Esmagador de Batata para fazer puré	1	0.33
Peça de Arte (obra de arte, escultura, quadro)	5	1.67	Fazer Barro (derretendo)	1	0.33
Prateleiras/estante	4	1.33	Fazer um carro de brincar	1	0.33
Para desenhar/riscar	3	1.00	Fazer um Jogo	1	0.33
Para dividir/barreira/criar espaços	3	1.00	Fita métrica	1	0.33
Separador de objectos vários	3	1.00	Jogos de Rua	1	0.33
Tapar buracos	3	1.00	Martelo	1	0.33
Alvo (de pressão de ar/tiro)	2	0.67	Monte	1	0.33
Assinalar algo (e.g. Balizas)	2	0.67	Oração de Taizé	1	0.33
Bricolage	2	0.67	Paisagismo	1	0.33
Brincar	2	0.67	Partir em pedaços para atirar ao cão	1	0.33
Contra-peso	2	0.67	Piramides	1	0.33
Cozinhar	2	0.67	Pistas de Carros	1	0.33
Garrafeira	2	0.67	Prova de Karaté	1	0.33
Levantar Pesos	2	0.67	Separa-Livros	1	0.33
Para partir algo	2	0.67	Sistema de Drenagem de água	1	0.33
Vender/ganhar dinheiro	2	0.67	Suporte de Tubos	1	0.33
Cunha para a porta	1	0.33	Ricochete na água com bocados	1	0.33
Abrigar	1	0.33	Usar como resposta de uma adivinha	1	0.33
			Total	300	100.00

*Note: Unique answers ( $\leq 1\%$ ) are highlighted.*

**Table A8***Frequency of occurrences of keywords for Can*

<u>Can</u>					
Keywords	Freq.	%	Keywords	Freq.	%
Copo para Material Escolar	36	11.39	Presépio	1	0.32
Vaso/jarra	30	9.49	Casinha de Bonecas	1	0.32
Reciclar	25	7.91	Fantoches	1	0.32
Cinzeiro	24	7.59	Escamas de Peixe	1	0.32
Decoração	23	7.28	Andas	1	0.32
Copo/Guardar líquidos	19	6.01	Canteiro para especiarias	1	0.32
Arte Moderna	15	4.75	Dado	1	0.32
Caixa para Guardar Objectos	11	3.48	Bijuteria	1	0.32
Instrumento Musical	9	2.85	Castiçal	1	0.32
Mealheiro	9	2.85	Guardar Gelo	1	0.32
Tiro ao Alvo	7	2.22	Tapar buracos	1	0.32
Bola	6	1.90	Aquário	1	0.32
Lixo	6	1.90	Prender a um carro para fazer barulho	1	0.32
Brinquedo (geral)	5	1.58	Fazer gelatina	1	0.32
Bowling	5	1.58	Coluna	1	0.32
Coleccionar	4	1.27	Copiar chaves	1	0.32
Copo para escovas de dentes	4	1.27	Usar anilhas para fazer duplo-cabide	1	0.32
Candeeiro	4	1.27	Demarcar Balizas	1	0.32
Trabalhos Manuais	4	1.27	Funil	1	0.32
Telefone	3	0.95	Chaleira	1	0.32
Vela	3	0.95	Calçada	1	0.32
Regador	3	0.95	Copos vintage	1	0.32
Jogos de Criança/campos de férias (geral)	3	0.95	Afastar Pássaros das Colheitas	1	0.32
Agredir alguém	2	0.63	Marco	1	0.32
Usar anilhas para Bijuteria	2	0.63	Roda	1	0.32
Objecto cortante	2	0.63	Carrinho	1	0.32
Estojo	2	0.63	Jarro	1	0.32
Base para copos (parte de baixo)	2	0.63	Suporte de Elásticos	1	0.32
Porta Chaves	2	0.63	Cinzeiro de praia	1	0.32
Camping gas/Fogão	2	0.63	Carteira	1	0.32
Rolamentos	1	0.32	Coleccionar anilhas	1	0.32
Utensílio de Cozinha (e.g. ralador)	1	0.32	Suporte para a colher de pau	1	0.32
Espanta Espíritos	1	0.32	Botija de água	1	0.32
Saltos Altos	1	0.32	Mini Prato	1	0.32
Medalhas	1	0.32	Recipiente para conservar comida	1	0.32
Modelo para desenhar	1	0.32	Caixa de bombons	1	0.32
Suporte para palhinhas	1	0.32	Carrinho de Rolamentos	1	0.32
			Total	316	100.00

*Note: Unique answers ( $\leq 1\%$ ) are highlighted.*

**Table A9***Frequency of occurrences of keywords for Newspaper*

Keywords	Newspaper		Keywords	Freq.	%
	Freq.	%			
Ler	43	10.80	Enchimento para caixa de	2	0.50
Atear fogo/ acender lareira	24	6.03	Guardar forma dos sapatosm/alas	2	0.50
Proteger superfícies de tinta/obras	23	5.78	Individual	2	0.50
Papier Machê	22	5.53	Puxar o lustre	2	0.50
Limpar vidros	20	5.03	Recortar letras para escrever	2	0.50
Trabalhos Manuais	13	3.27	Recriar Roupas	2	0.50
Chapéu/barco/avião	11	2.76	Rolo	2	0.50
WC para animais	11	2.76	Bater no cão quando se porta mal	1	0.25
Embrulhar presentes	10	2.51	Abanico (acender fogueira)	1	0.25
Decoração	10	2.51	Base para lixo	1	0.25
Embalar objectos para fazer viajar	10	2.51	Bases para tachos	1	0.25
Papel de Parede	10	2.51	Bastão de “Basebol” com bolas de ping-pong	1	0.25
Proteger objectos frágeis	10	2.51	Bastão para estacionar carros	1	0.25
Colagens	9	2.26	Candeeiro	1	0.25
Quadro/moldura	9	2.26	Capa	1	0.25
Reciclar	8	2.01	Capa de Telemóvel	1	0.25
Recortes	8	2.01	Cobertor	1	0.25
Leque	7	1.76	Cobrir	1	0.25
Origami	7	1.76	Confettis	1	0.25
Suporte de Castanhas	7	1.76	Cortinas	1	0.25
Embrulhar (geral)	6	1.51	Enchimento de almofadas/puffs	1	0.25
Forrar cadernos/livros	6	1.51	Envelope	1	0.25
Isolar/ Isolamento térmico	6	1.51	Fazer os Passatempos	1	0.25
Limpar (geral)	6	1.51	Flores de papel	1	0.25
Forrar	4	1.01	forrar almofadas	1	0.25
Toalha	5	1.26	Forrar assentos (sofás, carros)	1	0.25
Actualizar/informar	4	1.01	Fundo de uma gaiola de pássaros	1	0.25
Forrar Caixas/gavetas	4	1.01	Guardar noticia como recordação	1	0.25
Matar moscas/insectos	4	1.01	Isolar tenda do frio e humidade	1	0.25
Secar sapatos molhados	4	1.01	Jogo de Palavras	1	0.25
Tapete	4	1.01	Limpar o carro	1	0.25
Bater em alguém	3	0.75	Megafone (tubo)	1	0.25
Embrulhar comida	3	0.75	Pensar	1	0.25
Folha de Rascunho	3	0.75	Procurar Emprego	1	0.25
Folha para desenhar	3	0.75	Pulseiras	1	0.25
Papel Higiénico	3	0.75	Roupa para o Carnaval	1	0.25
Bola (para jogos)	2	0.50	Taças	1	0.25
Cama para os animais	2	0.50	Tela	1	0.25
Chapéu para a praia	2	0.50	Toalha de praia	1	0.25
Cobrir a cabeça da chuva	2	0.50	TV de brincar	1	0.25
Construir uma cesto/caixa	2	0.50	Vender	1	0.25
			Total	398	100.00

*Note: Unique answers ( $\leq 1\%$ ) are highlighted.*

## Appendix D - Outputs of Statistical Analyses

### Output 1 - Correlations between objects of the AUT for fluency

			FLU_Tij	FLU_lata	FLU_jor
Spearman's rho	FLU_Tij	Correlation Coefficient	1.000	.487**	.506**
		Sig. (2-tailed)	.	.000	.000
		N	81	81	81
	FLU_lata	Correlation Coefficient	.487**	1.000	.529**
		Sig. (2-tailed)	.000	.	.000
		N	81	81	81
	FLU_jor	Correlation Coefficient	.506**	.529**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	81	81	81

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

### Output 2 - Correlations between objects of the AUT for flexibility

			PFLE_Tij	PFLE_lata	PFLE_Jor
Spearman's rho	PFLE_Tij	Correlation Coefficient	1.000	.458**	.446**
		Sig. (2-tailed)	.	.000	.000
		N	81	81	81
	PFLE_lata	Correlation Coefficient	.458**	1.000	.563**
		Sig. (2-tailed)	.000	.	.000
		N	81	81	81
	PFLE_Jor	Correlation Coefficient	.446**	.563**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	81	81	81

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

### Output 3 - Correlations between objects of the AUT for originality I

			PORIG_Tij	PORIG_lata	PORIG_Jor
Spearman's rho	PORIG_Tij	Correlation Coefficient	1.000	.426**	.315**
		Sig. (2-tailed)	.	.000	.004
		N	81	81	81
	PORIG_lata	Correlation Coefficient	.426**	1.000	.240*
		Sig. (2-tailed)	.000	.	.031
		N	81	81	81
	PORIG_Jor	Correlation Coefficient	.315**	.240*	1.000
		Sig. (2-tailed)	.004	.031	.
		N	81	81	81

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

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

### Output 4 - Correlations between objects of the AUT for originality II

			OrigII_Tij	OrigII_Lata	OrigII_Jor
Spearman's rho	OrigII_Tij	Correlation Coefficient	1.000	.235 <sup>+</sup>	.175
		Sig. (2-tailed)	.	.035	.119
		N	81	81	81
	OrigII_Lata	Correlation Coefficient	.235 <sup>+</sup>	1.000	.113
		Sig. (2-tailed)	.035	.	.316
		N	81	81	81
	OrigII_Jor	Correlation Coefficient	.175	.113	1.000
		Sig. (2-tailed)	.119	.316	.
		N	81	81	81

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

### Output 5 - T-tests for Gender and DT measures

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
FLU_TOTAL	Equal variances assumed	.175	.677	-1.010	79	.315	-.44103	.43653	-1.30992	.42786
	Equal variances not assumed			-1.035	42.547	.307	-.44103	.42626	-1.30093	.41887
PFLE_TOTAL	Equal variances assumed	.163	.687	-1.774	79	.080	-.56147	.31657	-1.19159	.06865
	Equal variances not assumed			-1.831	43.307	.074	-.56147	.30663	-1.17972	.05678
PORIG_TOTAL	Equal variances assumed	.000	.987	-1.486	79	.141	-.26187	.17624	-.61267	.08893
	Equal variances not assumed			-1.454	38.729	.154	-.26187	.18006	-.62616	.10242
OrigII_TOTAL	Equal variances assumed	.168	.683	.229	79	.820	.014137	.061821	-.108915	.137190
	Equal variances not assumed			.221	37.868	.826	.014137	.063890	-.115216	.143490

### Output 6 - ANOVA for Age x DT measures

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	OrigII_TOTAL	.951 <sup>a</sup>	20	.048	.700	.810	.192
	PORIG_TOTAL	8.014 <sup>b</sup>	20	.401	.719	.790	.196
	PFLE_TOTAL	24.310 <sup>c</sup>	20	1.215	.676	.833	.186
	FLU_TOTAL	46.120 <sup>d</sup>	20	2.306	.706	.804	.193
Intercept	OrigII_TOTAL	108.785	1	108.785	1602.266	.000	.964
	PORIG_TOTAL	32.156	1	32.156	57.732	.000	.495
	PFLE_TOTAL	433.316	1	433.316	241.081	.000	.803
	FLU_TOTAL	663.681	1	663.681	203.224	.000	.775
idade.0	OrigII_TOTAL	.951	20	.048	.700	.810	.192
	PORIG_TOTAL	8.014	20	.401	.719	.790	.196
	PFLE_TOTAL	24.310	20	1.215	.676	.833	.186
	FLU_TOTAL	46.120	20	2.306	.706	.804	.193
Error	OrigII_TOTAL	4.006	59	.068			
	PORIG_TOTAL	32.862	59	.557			
	PFLE_TOTAL	106.046	59	1.797			
	FLU_TOTAL	192.680	59	3.266			
Total	OrigII_TOTAL	243.134	80				
	PORIG_TOTAL	98.111	80				
	PFLE_TOTAL	1037.111	80				
	FLU_TOTAL	1605.556	80				
Corrected Total	OrigII_TOTAL	4.957	79				
	PORIG_TOTAL	40.876	79				
	PFLE_TOTAL	130.356	79				
	FLU_TOTAL	238.800	79				

a. R Squared = .192 (Adjusted R Squared = -.082)

b. R Squared = .196 (Adjusted R Squared = -.076)

## Output 7 - ANOVA for Group x DT measures

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	FLU_TOTAL	35.092 <sup>a</sup>	3	11.697	4.169	.009	.140
	PFLE_TOTAL	19.317 <sup>b</sup>	3	6.439	4.264	.008	.142
	PORIG_TOTAL	2.145 <sup>c</sup>	3	.715	1.398	.250	.052
	Origll_TOTAL	.083 <sup>d</sup>	3	.028	.433	.730	.017
Intercept	FLU_TOTAL	1438.035	1	1438.035	512.543	.000	.869
	PFLE_TOTAL	949.835	1	949.835	629.065	.000	.891
	PORIG_TOTAL	61.246	1	61.246	119.705	.000	.609
	Origll_TOTAL	236.880	1	236.880	3727.560	.000	.980
CONDIÇÃO	FLU_TOTAL	35.092	3	11.697	4.169	.009	.140
	PFLE_TOTAL	19.317	3	6.439	4.264	.008	.142
	PORIG_TOTAL	2.145	3	.715	1.398	.250	.052
	Origll_TOTAL	.083	3	.028	.433	.730	.017
Error	FLU_TOTAL	216.038	77	2.806			
	PFLE_TOTAL	116.264	77	1.510			
	PORIG_TOTAL	39.396	77	.512			
	Origll_TOTAL	4.893	77	.064			
Total	FLU_TOTAL	1664.333	81				
	PFLE_TOTAL	1069.222	81				
	PORIG_TOTAL	100.889	81				
	Origll_TOTAL	245.650	81				
Corrected Total	FLU_TOTAL	251.130	80				
	PFLE_TOTAL	135.580	80				
	PORIG_TOTAL	41.542	80				
	Origll_TOTAL	4.976	80				

a. R Squared = .140 (Adjusted R Squared = .106)

b. R Squared = .142 (Adjusted R Squared = .109)

c. R Squared = .052 (Adjusted R Squared = .015)

d. R Squared = .017 (Adjusted R Squared = -.022)

## Output 8 - Post-Hoc LSD for Multiple Comparisons between Groups for Fluency

(I) CONDIÇÃO	(J) CONDIÇÃO	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
D	Dd	-.3849	.50051	.444	-1.3816	.6117
	Fx	-1.8710*	.55584	.001	-2.9779	-.7642
	NV	-.4294	.52334	.415	-1.4715	.6127
Dd	D	.3849	.50051	.444	-.6117	1.3816
	Fx	-1.4861*	.54061	.007	-2.5626	-.4096
	NV	-.0444	.50714	.930	-1.0543	.9654
Fx	D	1.8710*	.55584	.001	.7642	2.9779
	Dd	1.4861*	.54061	.007	.4096	2.5626
	NV	1.4417*	.56182	.012	.3229	2.5604
NV	D	.4294	.52334	.415	-.6127	1.4715
	Dd	.0444	.50714	.930	-.9654	1.0543
	Fx	-1.4417*	.56182	.012	-2.5604	-.3229

Based on observed means.

The error term is Mean Square(Error) = 2.806.

\*. The mean difference is significant at the 0

### Output 9 - Post-Hoc LSD for Multiple Comparisons between Groups for Flexibility

(I) CONDIÇÃO	(J) CONDIÇÃO	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
D	Dd	-.0933	.36717	.800	-.8244	.6379
	Fx	-1.3224*	.40776	.002	-2.1344	-.5105
	NV	-.3016	.38392	.435	-1.0661	.4629
Dd	D	.0933	.36717	.800	-.6379	.8244
	Fx	-1.2292*	.39659	.003	-2.0189	-.4395
	NV	-.2083	.37203	.577	-.9491	.5325
Fx	D	1.3224*	.40776	.002	.5105	2.1344
	Dd	1.2292*	.39659	.003	.4395	2.0189
	NV	1.0208*	.41215	.015	.2001	1.8415
NV	D	.3016	.38392	.435	-.4629	1.0661
	Dd	.2083	.37203	.577	-.5325	.9491
	Fx	-1.0208*	.41215	.015	-1.8415	-.2001

Based on observed means.

The error term is Mean Square(Error) = 1.510.

\*. The mean difference is significant at the 0

### Output 10 - Non Parametric ANOVA on Ranks

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Rank of FLU_TOTAL	5130.157 <sup>a</sup>	3	1710.052	3.389	.022	.117
	Rank of PFLE_TOTAL	5794.904 <sup>b</sup>	3	1931.635	3.902	.012	.132
	Rank of PORIG_TOTAL	1873.847 <sup>c</sup>	3	624.616	1.167	.328	.043
	Rank of Origll_TOT	1014.865 <sup>d</sup>	3	338.288	.602	.616	.023
Intercept	Rank of FLU_TOTAL	139911.791	1	139911.791	277.243	.000	.783
	Rank of PFLE_TOTAL	141071.022	1	141071.022	284.935	.000	.787
	Rank of PORIG_TOTAL	137809.283	1	137809.283	257.458	.000	.770
	Rank of Origll_TOT	136662.579	1	136662.579	243.227	.000	.760
CONDIÇÃO	Rank of FLU_TOTAL	5130.157	3	1710.052	3.389	.022	.117
	Rank of PFLE_TOTAL	5794.904	3	1931.635	3.902	.012	.132
	Rank of PORIG_TOTAL	1873.847	3	624.616	1.167	.328	.043
	Rank of Origll_TOT	1014.865	3	338.288	.602	.616	.023
Error	Rank of FLU_TOTAL	38858.343	77	504.654			
	Rank of PFLE_TOTAL	38122.596	77	495.099			
	Rank of PORIG_TOTAL	41215.653	77	535.268			
	Rank of Origll_TOT	43264.135	77	561.872			
Total	Rank of FLU_TOTAL	180149.500	81				
	Rank of PFLE_TOTAL	180078.500	81				
	Rank of PORIG_TOTAL	179250.500	81				
	Rank of Origll_TOT	180440.000	81				
Corrected Total	Rank of FLU_TOTAL	43988.500	80				
	Rank of PFLE_TOTAL	43917.500	80				
	Rank of PORIG_TOTAL	43089.500	80				
	Rank of Origll_TOT	44279.000	80				

a. R Squared = .117 (Adjusted R Squared = .082)

b. R Squared = .132 (Adjusted R Squared = .098)

c. R Squared = .043 (Adjusted R Squared = .006)

d. R Squared = .023 (Adjusted R Squared = -.015)

### Output 11 - Correlations between DT measures

			FLU_TOTAL	PFLE_TOTAL	PORIG_TOTA L	Origil_TOTAL
Spearman's rho	FLU_TOTAL	Correlation Coefficient	1.000	.938**	.830**	.499**
		Sig. (2-tailed)	.	.000	.000	.000
		N	81	81	81	81
	PFLE_TOTAL	Correlation Coefficient	.938**	1.000	.762**	.428**
		Sig. (2-tailed)	.000	.	.000	.000
		N	81	81	81	81
	PORIG_TOTAL	Correlation Coefficient	.830**	.762**	1.000	.614**
		Sig. (2-tailed)	.000	.000	.	.000
		N	81	81	81	81
	Origil_TOTAL	Correlation Coefficient	.499**	.428**	.614**	1.000
		Sig. (2-tailed)	.000	.000	.000	.
		N	81	81	81	81

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

### Output 12 - ANCOVA for Group x DT measures (Flexibility and Originality I) Controlling for Fluency

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	PFLE_TOTAL	121.446 <sup>a</sup>	4	30.362	163.255	.000	.896
	PORIG_TOTAL	29.749 <sup>b</sup>	4	7.437	47.929	.000	.716
Intercept	PFLE_TOTAL	2.942	1	2.942	15.820	.000	.172
	PORIG_TOTAL	4.287	1	4.287	27.627	.000	.267
FLU_TOTAL	PFLE_TOTAL	102.129	1	102.129	549.154	.000	.878
	PORIG_TOTAL	27.603	1	27.603	177.891	.000	.701
CONDIÇÃO	PFLE_TOTAL	.573	3	.191	1.028	.385	.039
	PORIG_TOTAL	.633	3	.211	1.361	.261	.051
Error	PFLE_TOTAL	14.134	76	.186			
	PORIG_TOTAL	11.793	76	.155			
Total	PFLE_TOTAL	1069.222	81				
	PORIG_TOTAL	100.889	81				
Corrected Total	PFLE_TOTAL	135.580	80				
	PORIG_TOTAL	41.542	80				

a. R Squared = .896 (Adjusted R Squared = .890)

b. R Squared = .716 (Adjusted R Squared = .701)

### Output 13 - ANOVA for Group x Nostalgia

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	38.116 <sup>a</sup>	2	19.058	5.222	.008	.153
Intercept	1212.381	1	1212.381	332.230	.000	.851
CONDIÇÃO	38.116	2	19.058	5.222	.008	.153
Error	211.655	58	3.649			
Total	1572.000	61				
Corrected Total	249.770	60				

a. R Squared = .153 (Adjusted R Squared = .123)

**Output 14 - Post-Hoc LSD for Multiple Comparisons between Groups for Nostalgia**

(I) CONDIÇÃO	(J) CONDIÇÃO	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
D	Dd	-.48	.571	.408	-1.62	.67
	Fx	1.48*	.634	.023	.21	2.75
Dd	D	.48	.571	.408	-.67	1.62
	Fx	1.96*	.617	.002	.72	3.19
Fx	D	-1.48*	.634	.023	-2.75	-.21
	Dd	-1.96*	.617	.002	-3.19	-.72

Based on observed means.

The error term is Mean Square(Error) = 3.649.

\*. The mean difference is significant at the

**Output 15 - ANCOVA for Group x DT measures Controlling for Nostalgia**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	FLU_TOTAL	35.734 <sup>a</sup>	6	5.956	2.025	.078	.184
	PFLE_TOTAL	12.678 <sup>b</sup>	6	2.113	1.190	.326	.117
	PORIG_TOTAL	2.506 <sup>c</sup>	6	.418	.858	.531	.087
	OrigII_TOTAL	.081 <sup>d</sup>	6	.013	.209	.973	.023
Intercept	FLU_TOTAL	978.502	1	978.502	332.675	.000	.860
	PFLE_TOTAL	624.388	1	624.388	351.538	.000	.867
	PORIG_TOTAL	40.479	1	40.479	83.184	.000	.606
	OrigII_TOTAL	148.451	1	148.451	2305.035	.000	.977
Nstlg	FLU_TOTAL	35.734	6	5.956	2.025	.078	.184
	PFLE_TOTAL	12.678	6	2.113	1.190	.326	.117
	PORIG_TOTAL	2.506	6	.418	.858	.531	.087
	OrigII_TOTAL	.081	6	.013	.209	.973	.023
Error	FLU_TOTAL	158.831	54	2.941			
	PFLE_TOTAL	95.913	54	1.776			
	PORIG_TOTAL	26.278	54	.487			
	OrigII_TOTAL	3.478	54	.064			
Total	FLU_TOTAL	1285.778	61				
	PFLE_TOTAL	820.111	61				
	PORIG_TOTAL	73.111	61				
	OrigII_TOTAL	184.413	61				
Corrected Total	FLU_TOTAL	194.565	60				
	PFLE_TOTAL	108.590	60				
	PORIG_TOTAL	28.783	60				
	OrigII_TOTAL	3.559	60				

a. R Squared = .184 (Adjusted R Squared = .093)

b. R Squared = .117 (Adjusted R Squared = .019)

c. R Squared = .087 (Adjusted R Squared = -.014)

d. R Squared = .023 (Adjusted R Squared = -.086)

**Output 16 - ANOVA for Nostalgia x DT Measures**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	FLU_TOTAL	35.349 <sup>a</sup>	3	11.783	4.218	.009	.182
	PFLE_TOTAL	19.221 <sup>b</sup>	3	6.407	4.086	.011	.177
	PORIG_TOTAL	2.205 <sup>c</sup>	3	.735	1.577	.205	.077
	OrigII_TOTAL	.176 <sup>d</sup>	3	.059	.987	.405	.049
Intercept	FLU_TOTAL	189.779	1	189.779	67.942	.000	.544
	PFLE_TOTAL	109.545	1	109.545	69.868	.000	.551
	PORIG_TOTAL	8.138	1	8.138	17.453	.000	.234
	OrigII_TOTAL	23.495	1	23.495	395.892	.000	.874
Nstlg	FLU_TOTAL	.939	1	.939	.336	.564	.006
	PFLE_TOTAL	.005	1	.005	.003	.955	.000
	PORIG_TOTAL	.063	1	.063	.135	.715	.002
	OrigII_TOTAL	.094	1	.094	1.584	.213	.027
CONDIÇÃO	FLU_TOTAL	26.811	2	13.405	4.799	.012	.144
	PFLE_TOTAL	16.385	2	8.193	5.225	.008	.155
	PORIG_TOTAL	1.587	2	.793	1.701	.192	.056
	OrigII_TOTAL	.147	2	.073	1.235	.298	.042
Error	FLU_TOTAL	159.216	57	2.793			
	PFLE_TOTAL	89.370	57	1.568			
	PORIG_TOTAL	26.578	57	.466			
	OrigII_TOTAL	3.383	57	.059			
Total	FLU_TOTAL	1285.778	61				
	PFLE_TOTAL	820.111	61				
	PORIG_TOTAL	73.111	61				
	OrigII_TOTAL	184.413	61				
Corrected Total	FLU_TOTAL	194.565	60				
	PFLE_TOTAL	108.590	60				
	PORIG_TOTAL	28.783	60				
	OrigII_TOTAL	3.559	60				

**Output 17 - Post-Hoc LSD for Multiple Comparisons between Nostalgia for Fluency**

(I) Nostalgia	(J) Nostalgia	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Nenhuma Nostalgia 1	2	-.5429	1.00422	.591	-2.5562	1.4705
	3	-1.3095	.95415	.176	-3.2225	.6034
	4	1.3238	1.00422	.193	-.6895	3.3371
	5	.7905	.78503	.318	-.7834	2.3644
	6	-.3810	.91672	.679	-2.2189	1.4570
	Muita Nostalgia 7	.7946	.77719	.311	-.7635	2.3528
2	Nenhuma Nostalgia 1	.5429	1.00422	.591	-1.4705	2.5562
	3	-.7667	1.03850	.464	-2.8487	1.3154
	4	1.8667	1.08468	.091	-.3080	4.0413
	5	1.3333	.88564	.138	-.4423	3.1089
	6	.1619	1.00422	.873	-1.8514	2.1752
	Muita Nostalgia 7	1.3375	.87869	.134	-.4242	3.0992
3	Nenhuma Nostalgia 1	1.3095	.95415	.176	-.6034	3.2225
	2	.7667	1.03850	.464	-1.3154	2.8487
	4	2.6333*	1.03850	.014	.5513	4.7154
	5	2.1000*	.82844	.014	.4391	3.7609
	6	.9286	.95415	.335	-.9844	2.8415
	Muita Nostalgia 7	2.1042*	.82101	.013	.4581	3.7502
4	Nenhuma Nostalgia 1	-1.3238	1.00422	.193	-3.3371	.6895
	2	-1.8667	1.08468	.091	-4.0413	.3080
	3	-2.6333*	1.03850	.014	-4.7154	-.5513
	5	-.5333	.88564	.550	-2.3089	1.2423
	6	-1.7048	1.00422	.095	-3.7181	.3086
	Muita Nostalgia 7	-.5292	.87869	.550	-2.2908	1.2325
5	Nenhuma Nostalgia 1	-.7905	.78503	.318	-2.3644	.7834
	2	-1.3333	.88564	.138	-3.1089	.4423
	3	-2.1000*	.82844	.014	-3.7609	-.4391
	4	.5333	.88564	.550	-1.2423	2.3089
	6	-1.1714	.78503	.141	-2.7453	.4025
	Muita Nostalgia 7	.0042	.61638	.995	-1.2316	1.2399
6	Nenhuma Nostalgia 1	.3810	.91672	.679	-1.4570	2.2189
	2	-.1619	1.00422	.873	-2.1752	1.8514
	3	-.9286	.95415	.335	-2.8415	.9844
	4	1.7048	1.00422	.095	-.3086	3.7181
	5	1.1714	.78503	.141	-.4025	2.7453
	Muita Nostalgia 7	1.1756	.77719	.136	-.3826	2.7338
Muita Nostalgia 7	Nenhuma Nostalgia 1	-.7946	.77719	.311	-2.3528	.7635
	2	-1.3375	.87869	.134	-3.0992	.4242
	3	-2.1042*	.82101	.013	-3.7502	-.4581
	4	.5292	.87869	.550	-1.2325	2.2908
	5	-.0042	.61638	.995	-1.2399	1.2316
	6	-1.1756	.77719	.136	-2.7338	.3826

Based on observed means.  
The error term is Mean Square(Error) = 2.941.