Evolutionary Algorithm Principles Applied to Creative Agencies:

Fostering Employee Creative Self-Efficacy Through Openness to Risk and Goal-Orientation

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Thesis submitted on 17-06-2021

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Preface

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Abstract

Many implementations of evolutionary algorithms have been beating advertisements in terms of engagement, while companies implement a risk-encouraging "fail more" mentality. This study attempts to increase creative self-efficacy (a creative professionals' belief in their own ability to solve difficult problems at work) inside creative agencies by manipulating a creative director's level of openness to risk and goal-orientation. The experiment was conducted in an online scenario survey, with a sample consisting of creative professionals from Brazil and The Netherlands who currently work in the industry. Results show a main effect of goal-orientation on creative self-efficacy, and most importantly, an interaction effect between goal-orientation and openness to risk. Openness to risk did not predict creative self-efficacy. We conclude that encouraging risk is only impactful in the creative environment when also establishing an empirical criterion for idea selection.

Introduction

Opening remarks

"The best ideas come as jokes; make your thinking as funny as possible", wrote David Ogilvy, known as the "father of advertising" (Sabella, 2006). With this quote, Ogilvy brings attention to one of the most important aspects of the advertising industry: openness to solutions that at first seem too absurd to even consider. Some of these absurd solutions, when applied, might work better than a traditional solution. For example, running an advertising campaign for a hamburger chain with photos of rotting food might sound absurd at first, but the idea originated the most successful Burger King campaign of 2020 (Warc, 2020). The 'Moldy Whopper' campaign featured images of the restaurant's main dish decaying naturally as a way to promote the recent removal of artificial preservatives from the recipe.

Staying open to the unconventional has shown to be one of the most important components of creativity (McCrae, 1987). Meaning that those who are able to see possibilities even in the most absurd ideas tend to have a higher likelihood of coming up with more innovative ones. In this study, this construct is applied to the management style of creative directors in creative agencies. It will be addressed as *openness to risk*, and it regards the posture of managerial openness to unconventional ideas (as opposed to closeness to unconventional ideas) (Scratchley, & Hakstian, 2001). That is, how comfortable a manager is with approving a risky idea.

David Ogilvy proceeds to express his views in his prescription to advertising professionals by stating: "never stop testing and your advertising will never stop improving" (Cook, 1999). This trial-and-error proposition adds that, besides staying open to ideas, the other

most important creative criterion in advertising is to be guided by measurable campaign outcomes —often sales, brand awareness, or brand attitude to name a few (Armstrong, 2010). In this study, this construct is addressed as *goal-orientation*, and it regards the managerial criteria (a filtering process) of choosing employee ideas solely based on their measurable performance (Zitzler, & Künzli, 2004). That is, how comfortable a creative director is to select the best idea out of a pool of ideas according to, for example, how well each of them performed in terms of sales with the target audience (as opposed to choosing based on intuition or personal taste).

In this study, we look at how the two aforementioned constructs, namely: (1) openness to risk, and (2) goal-orientation, influence creative self-efficacy in individuals working in creative agencies (advertising/design agencies). *Creative self-efficacy* regards the self-view that a creative employee believes in their own ability to produce creative outcomes (Tierney & Farmer, 2002).

The results of this study shall contribute to a further increase in performance inside advertising agencies, especially at such a crucial time in the industry.

Managerial/Academic Relevance

This time in the industry is deemed crucial because the demand for services provided by the creative industry (namely, the industry of creative agencies) has been increasing over the past few years (García, 2020). More and more niched consumer brands have been able to exponentially grow to unprecedented dimensions due to an expansion from punctual consumer touch points in physical locations onto a vast and ever-present digital marketplace (Ruggieri et al., 2018). These new digital consumer touchpoints demand ongoing maintenance of branding assets and creative services alike. Besides, creativity- and design-related services have also been

propelled by the transition to online services during the pandemic, and are expected to remain consolidated even after a new normal (Arora, Dahlström, Hazan, Khan, & Khanna, 2020).

The creative industry is one of extreme competitiveness with considerable client churn rates. In the United States, for example, major creative agencies lose on average 67% of their clients every five years (Henke, 1995). And, according to a study in the United Kingdom, most switches result from client dissatisfaction with agency performance (Doyle, Corstjens, & Michell, 1980). So, in sum, agencies have a constant need to perform at their very best.

Previous studies have looked into ways to increase team creative performance from a managerial perspective in creative agencies. On the idea generation side, creative directors get better results when they encourage employees to produce large quantities of ideas and to take risks (Bergh, Reid, & Schorin, 1983; Dewett, 2006). On the idea selection side, creative directors get better creative performance by selecting ideas based on their appropriateness with the target audience, rather than relying on their own personal perceptions, since selecting ideas based on intuition tends to prioritize (self-)desirable ideas and feasible, yet plain ideas, hindering originality (Kilgour, Koslow, & O'Connor, 2020; Rietzschel, Nijstad, & Stroebe, 2010).

Finding and understanding the particular managerial activities that increase creative performance is more important now than ever before. But what is the relevance of applying these concepts of goal-orientation and openness to risk? In order to situate the reader in the tangible use and full potential of the aforementioned principles, this study proceeds with an evaluation and interpretation of the most successful iterations of creativity in the last few years, as well as an analysis of the current industry practices before arriving at the final research question.

The current arena

With the advent of the internet, the creative industry has gotten even more competitive. In recent years, creative agencies have been falling behind in the ongoing competition for attention in digital media (Weng et al., 2012). Viral content has shown to perform significantly better than traditional advertising in terms of word-of-mouth distribution due to its more provocative nature (Lance & Guy, 2006). That is, in social media feeds (such as Instagram and TikTok), memes and other types of spontaneous user-generated content are considerably drawing more engagement, attention, and redistribution than traditional advertising pieces.

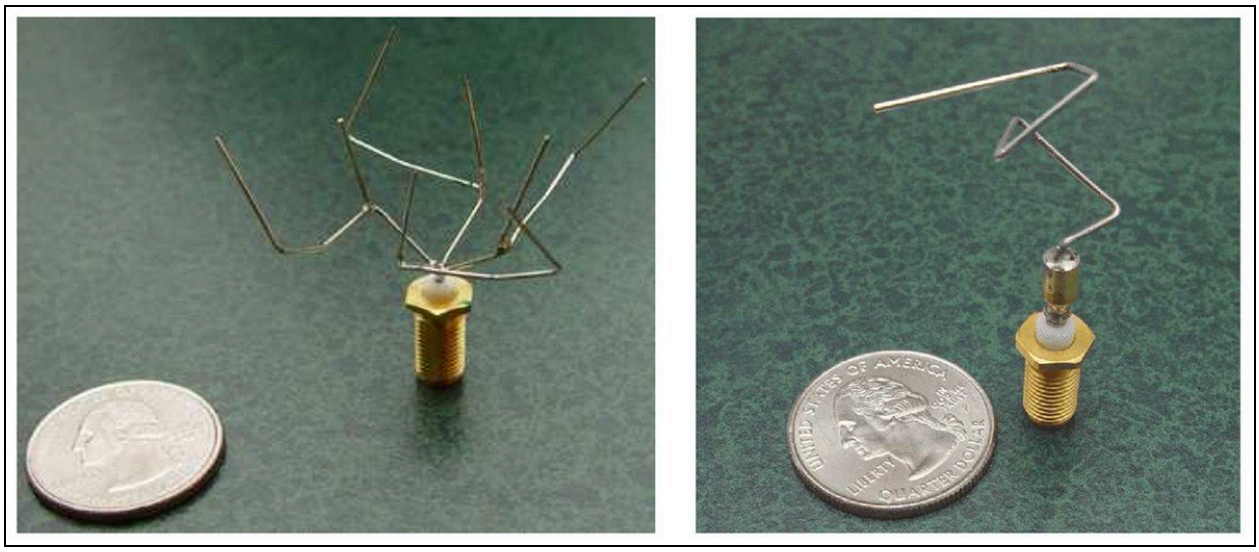
Interestingly, the process of creating and distributing memes in these platforms so happens to follow the exact same criteria proposed earlier by David Ogilvy. The meme generation process involves both: (1) an initial creation of large amounts of divergent ideas, regardless of absurdity and risk (a.k.a. openness to risk); and (2) posting and distributing these ideas to the audience in order to test, select, and replicate the winning pieces according to their ability to yield more likes than others within certain niches (a.k.a. goal-orientation).

From an information-generation perspective, the aforementioned process mirrors the principles of evolutionary algorithms: defined as a Darwinian-evolution inspired information architecture for generating novel information (Bentley, & Corne, 2002). So what if these principles were applied to the creative industry environment as a means for creativity enhancement?

The approach of evolutionary algorithms in tackling design issues has gained particular relevance in the late 90s with the rise of computer science (Bentley, & Corne, 2002), and has shown to be a powerful tool in finding novel solutions to time- and labor-intensive tasks such as

designing flight antennas for NASA's ST5 mission (Hornby, Globus, Linden, & Lohn, 2006). The antenna design method in the ST5 mission makes use of a "black-box" approach. That is, rather than attempting to understand the unfathomable complexity of wave propagation in space, the method uses intuition followed by testing in an extensive process of trial-and-error. It involved programming algorithms to randomly explore a virtual space generating several highly unconventional antenna shapes, while testing each of these applications with virtually simulated electromagnetic waves.

Figure 1 - Evolutionary antennas (Dunbar, 2004)



The procedure has been used to generate highly performing antennas for a variety of different aerospace applications (Hornby, Globus, Linden, & Lohn, 2006). One important feature of this design method is that, due to the complexity of each context in each aeroespacial application, there cannot be an ideal "one-size-fits-all" type of antenna. So this process is iterated from scratch for each particular circumstance.

Similarly, memes thrive as the media landscape steps away from a mass media "one-size-fits-all" omnichannel world view onto a multi-media multi-contextual niched reality (Lemos, 2010). Therefore, the meme generation process (similar to the context-specific evolutionary antenna designs) seems to particularly succeed at engaging niche audiences while targeting and testing highly unconventional variations of ideas within each culture. That is, it seems that there is no ideal type of meme because each cultural niche collectively chooses a particular type of content developed solely for their particular context. This customization could be the reason why memes conquer such high levels of engagement.

One example of an online environment that fosters content and meme distribution through evolutionary algorithms is the recently famous entertainment social network TikTok (Wei, & Chokshi, 2021). Both variables addressed in this study are arguably the two features that contributed to its success.

The first feature placing TikTok at an advantageous position in comparison to other social networks like Instagram is that it features a vast amount of creation tools (Wei, & Chokshi, 2021). Video editing, audio editing, video FX, video graphics, and licensed music were instruments previously available only to professionals with powerful desktop computers. Now the app has massively lowered barriers to creativity. That is, with so many unconventional creative possibilities vastly accessible to anybody with a smartphone, TikTok manages to encourage higher levels of openness to risk right off the bat.

The second feature is selection and filtering through empirical testing. TikTok's algorithm extensively tests every single piece of content uploaded to the network with random users, without filtering out contents before they're randomly tested (Wei, & Chokshi, 2021). This

feature is relevant in its novelty when compared to YouTube's and Facebook's algorithms. That is, most content uploaded onto YouTube never gets to see the light of day, because its views depend on search queries and organic shares. And the distribution of most content uploaded onto Facebook is only shown to a small share of friends within the user's social circle, bounded by the users' pre-diagnosed social relevance in that circle.

However, when a user uploads a video to TikTok, it does not just sit there (Wei, & Chokshi, 2021). The algorithm tests it with other randomly selected users, each pre-categorized as representative of a separate niche culture. Then, based on the performance of that video, the algorithm chooses to cascade it onto each of the tested niches or not. Unlike YouTube, TikTok voluntarily chooses not to ignore small creators. Viewers are always being shown something that has been tested on an audience, and that content is often fresh coming from regular, non-famous people. In sum, the algorithm links content to interest, fully capitalizing on creativity that would have gotten left aside.

Therefore, evolutionary algorithms present a potential framework to understand and possibly replicate the viral qualities of the meme generation process into creative agencies, while maintaining the "black-box" approach of intuition at the ideation stage. That is, rather than attempting to decipher what combination of content characteristics make "a good ad", this study aims to understand what environmental cues in the design process contribute to the full capitalization and unleashing of highly appealing content. And, as opposed to previous studies focused on developing evolutionary algorithm tools for creating content itself (Abeer, Lina & Manar, 2018; Bury, 2016; Chambel et al, 2007), this approach looks at a managerial-level application of such principles from a human resources perspective.

The current inertia

Creative agencies have been attempting to borrow charasteritistics of memes into advertising as an attempt to increase audience engagement (Lechner, 2020). But the results have been subpar, with regrettably low engagement indicators on most implementations (Hootsuite, 2017).

The problem lies in inertia: most procedural frameworks followed in creative agencies respect mass-media standards established over 40 years ago, from market research to ideation, selection, and testing (Cramphorn, 2004). But ideas often only get tested after the creative director's approval (Kilgour, Koslow, & O'Connor, 2020). Furthermore, the approval of ideas is often dependent on subjective opinions manifested throughout the value chain (coming from clients' and/or managers' personal tastes) rather than empirically testing with the target audience. Due to the artistic nature of the work, it is widely accepted that creative directors choose which ideas will make it to the testing phase. That is, creative directors pre-filter ideas based on intuition and taste rather than direct measures and empirical evidence. So most of the testing in creative agencies is inherently biased. And ideas get tossed due to this consolidated inert belief that experience always knows best (Anderson, 2010).

The pre-selection in testing puts the agency at risk of killing good ideas early on and engaging in a feedback loop that is not in line with principles of evolutionary algorithms (Leckenby & Plummer, 1983). However, testing unfinished ideas without any pre-selection is far from being widely adopted in creative agencies because it is still perceived as too costly, despite the recent price drops and broad availability thanks to services such as Google ads.

The result, from a human resources point of view, is unfortunate: employees get unmotivated. Take São Paulo city, Latin America's greatest hotspot for advertising as an example (Coffee, 2020). Seasonally, creative professionals from most advertising agencies in the city spread an anonymous confession spreadsheet in which they share their grievances about their agencies' creative departments' internal procedures, and hierarchical schemes (Fujioka, 2020). The number of participants has been steadily rising, with a growth of over 468% in entries from 2016 (the first edition) to 2018 (the second edition).

Comments such as "good ideas are butchered daily by creative directors", "low diversity of insights", "hard to get approved by superiors", and "employees are fearful to present ideas" are only a few of the entries suggesting what seems to be low levels of creative self-efficacy (Enrique, 2019), which are often correlated with low levels of intrinsic motivation (Alzoubi et al., 2016; Gu, He, & Liu, 2017).

Therefore, if performance is subpar, and employees show signs of unmotivation seemingly linked to the dated design process present inside agencies, a new empirically confirmed procedural framework could contribute to better overall performance. That is, if this study succeeds in demonstrating that both low openness to risk and low goal-orientation are detrimental to creative self-efficacy, managers and researchers alike could attempt to implement a new framework for testing in which these two problems are addressed. In sum, a new guideline for creative directors to both stimulate the generation of risky ideas, while selecting the best ideas based on measurable constructs could contribute to a systematic, fast-paced, experimental managerial method to catch up to the new media.

The current solutions

A conversion towards this new fast-paced media model has already started. Let us now dive into how some of the policies applied within companies like Netflix have incorporated an environment with not only goal-orientation, but also openness to risk.

The data revolution of algorithms inside Netflix had been headed towards a new centralized dominant “television” culture featuring bland, "safe", and massively appealing shows (Taylor, 2017). But the real opportunity for highly engaging content seems to lie beyond in the diversification (openness to risk) of ideas combined with personalization (goal-orientation measured by niche response).

So, in answer to that trend, Netflix and other companies have been adopting strategies of experimentation and risk (Taylor, 2017). Managers have been encouraging employees to make mistakes, and have taken the total number of failures of the company as key performance indicators of innovation. Also, Netflix CEO Reed Hastings recently complained about the company’s hit ratio in making “too many” successful shows, and urged employees to increase the amount of shows cancelled after the first season.

By aiming to increase the amount of cancelled shows, Netflix ensures to be exploring and taking full advantage of their creative workforce by making more risky content. They would, therefore, succeed in implementing openness to risk. And when further testing and selecting these shows with a variety of different niches (say, featuring a new controversial series on the home page of a Netflix user who is representative of a certain niche), they succeed in implementing goal-orientation. The odds of extremely engaging content to emerge skyrocket.

Research question

So what if we mirrored TikTok's and Netflix's environment and applied these ideas into a procedural human resources framework inside advertising agencies as a way to not only yield more creativity, but also to increase employee intrinsic motivation?

If principles of evolutionary algorithms have enabled TikTok to fully capitalize on the creativity of individuals like me and you, what would it be able to do when applied to a setting of professionally creative employees? That could be a way to increase, among other aspects, the substandard 30% ratio of campaigns generating a powerful effect in the short term (Cramphorn, 2004). It could also yield more steady results in terms of both creativity and economic impact, increasing the staggering levels of client dissatisfaction in the industry.

This study aims to empirically understand which environmental characteristics are conducive to creativity, as measured in creative self-efficacy. It looks at how environmental factors such as openness to risk and goal-orientation predict an employee's creative self efficacy. This research objective is summarized in our research question:

RQ: What is the impact of managerial openness to risk and goal-orientation, on employee creative self-efficacy in creative agencies?

Contributions

Would creative self-efficacy increase if creatives could know that the assessment standards always remain the same and that they do not have to stick to "safer", less creative waters? These research findings should bring additional evidence to the existing academic debate on creative environments addressed above. The findings should also be able to better inform

managers, clients, and creatives as to what yields the most favorable creative results, and should be applicable to all creative agencies in the industry.

Theoretical Framework

Creative self-efficacy

Creative self-efficacy is defined as a creative professionals' belief in their own ability to solve difficult problems at work, if they try hard enough (Tierney & Farmer, 2002). That is, if creative agencies are engines, creative self-efficacy is the lubricant oil between the gears, with gears being the creative employees.

It has been chosen as the target variable of this study due its ability to measure the "level of flow" of an employee in an organization, and its measurability using self-report methods (Sadler, Shluzas, Blikstein, & Katila, 2015). The construct is also a more directly observable replacement for employee creativity, as it has shown to predict (Zhou & He, 2020). Furthermore, employee creativity usually cannot be measured as a self-report variable (e.g. Koslow et al., 2006), which would have limited the online distribution of this survey.

Moreover, through employee creativity, creative self-efficacy even predicts employee happiness which is deemed more important than financial success (Chen et al., 2018). Creative self-efficacy is also an indicator of intrinsic motivation, as it is predicted by both competence (Kovjanic et al., 2012), and autonomy (Zhou & He, 2020), two out of three variables presented in the self-determination theory (Bakker, & van Woerkom, 2017).

Openness to risk: independent variable

Openness to risk will result in higher creative self-efficacy. We have reason to believe this because prior research already showed that having higher levels of creative thinking is linked with fewer barriers to creative risk taking. The analogy is further developed in the following paragraphs.

Creative employees are usually described as divergent thinkers, who score high in openness to experience (McCrae, 1987). Cools & Van den Broeck (2007) identified three cognitive styles used by individual entrepreneurs when creating new ideas: knowing style (fed by access to information and market intelligence), planning style (fed by structure and order in going through rationales, linked to cognitive conversion), and creating style (fed by imagination as a tool for unconventional thinking, linked to cognitive diversion).

Creating style has been shown to be not only a strong predictor, but the only positive predictor of employee creativity out of the three cognitive styles (Chen et al., 2018). Cognitive diversion is probably the reason why, as it has also shown to predict creativity (Jung et al., 2015).

Individuals with cognitive creating styles have the ability to think of a large quantity of novel ideas in a short period of time in comparison to individuals with other cognitive styles. That is due to the fact that in such individuals, ideas flow with less filtering and self- (and perhaps also managerial-) regulation (Orjan de Manzano et al., 2010).

They have original ideas (Chen et al., 2018), featuring unconventional or infrequent qualities to them (Dreu et al., 2008). They are therefore more likely to come up with ideas outside the creative industry dominant systems, which can be also deemed as "risky ideas".

Risk is defined as the uncertainty to the outcome of a decision (Rodrigues & Veloso, 2013). Therefore, we can conclude that individuals with a creating style have less of a barrier to creative risk-taking than individuals belonging to other cognitive styles.

Risk, or as defined above "exploring new ideas", is conducive to creativity in creative agencies. For example, the more risk creative employees take, the more creative awards they win (El-Murad & West, 2003).

Although previous studies have shown that a risk-averse supervisory style yields more creativity than a risk-encouraging supervisory style, the results are likely not applicable to the context of creative agencies (Gu, He, & Liu 2017). That is due to both conceptual and contextual aspects of the study. On a contextual level, the study was conducted in a graduate school environment looking at the relationship between professors (compared to managers) with their students (compared to employees), while the tasks at hand had clearly defined milestones. That is, in a university setup creativity will only be deemed "properly creative" if contained within the bounds of the academic practices. In such a situation, a risk-averse supervision should indeed yield higher creative outcomes that are inevitably compliant to the existing criteria. That is also the reason why, on a conceptual level, the assessment criteria for creativity differed remarkably from that of a creative agency.

Therefore, the concept of "openness to risk" will be used to shape stimuli conditions with high (and low) levels of managerial openness and cognitive leniency towards divergent ideas, insights, or design solutions perceived as risky, unconventional, or unorthodox. Whenever these levels of openness to risk are lower, creative self-efficacy is also expected to be lower —an environmental negative reinforcement. The opposite should also be true. The perceived freedom

to manifest these unconventional ideas into drafts and proposals (an environmental positive reinforcement) will increase an individuals' sense of creative self-efficacy.

H1: A managerial approach with high openness to risk will result in higher creative self-efficacy scores compared to a managerial approach with low openness to risk for creative employees.

Goal-orientation: independent variable

The environment of creative agencies falls under the definition of a knowledge-intensive setting, in which the outcomes are not set in stone and solutions often need to be developed and tailored for each briefing (Latham & Yukl, 1975). In such settings, goal-orientation (aiming for a set outcome) has shown to yield higher employee creativity in comparison to no goal-orientation settings (in which managers prompted employees to "do their best") (Ringelhan et al., 2016).

Naturally, if the standards defining success keep unpredictably changing (in line with each new client's personal judgement, or the creative director's taste), it is expected that feelings of competence will also decrease .

In this study, goal-orientation will be manipulated as a standard based on which the manager makes decisions about the approval of a creative idea. The concept regards the empirical selection of ideas, and it represents (in its highest levels) a complete detachment from pre-existing taste as a filtering criteria while opening the way up for innovation. In such cases, an employee has no barriers in manifesting their skills onto innovative art pieces. That is assumed because when goal-orientation is implemented, the task would solely involve occupational-specific expertise, rather than dealing with internal politics, for example. It would

no longer involve the personal taste and preconceptions of the creative director or client, but rather, the employee's ability to craft work that sells —or that fulfills whatever other measurable goal for that matter.

Therefore, the variable "goal-orientation" is defined as an environmental tendency (either from managers, clients, or colleagues) to not demonstrate any judgement towards an idea until it is tested empirically with the target audience.

H2: A managerial approach with high goal-orientation will result in higher creative self-efficacy scores compared to a managerial approach with low goal-orientation for creative employees.

Evolutionary algorithms: introduction

This study incorporates a theoretical adaptation of the core principles of evolutionary algorithms onto creative environments. Most importantly, drawing this parallel lies out the basics to understand why the researcher expects a significant interaction effect between the aforementioned concepts of openness to risk and goal-orientation. It is a fundamental metaphor because it refers to the creative environment upon which TikTok thrived, an environment which succeeded in inducing high creativity content, an outcome deemed extremely relevant to the creative industry.

Evolutionary algorithms: operators

Bentley and Corne demonstrate in the book "Creative Evolutionary Systems" several variations of evolutionary algorithms attempting to mimic natural selection behavior found in

nature, while showing that such algorithms mostly vary in three genetic operators: crossover, mutation, and selection (2002). These operators come to action once an existing population of iterations has been implemented —the initial implementations are often randomly generated.

Crossover operators provide convergence (Yang, 2020). The process involves swapping parts of each iteration, reaching sub-mixes of the solutions previously found and it usually takes shorter to reach saturation of possibilities in comparison to mutation operators. That is, crossover operators refer to the degree and method of combining existing forms into new forms (Câmara, 2015). The problem with having only this operator, is that the sub-mixes are very likely to be an ephemeral picture of the whole spectrum of possibilities, and the selected best performing output is likely to underperform in comparison to an iteration featuring mutation operators.

Mutation operators provide diversity (Yang, 2020). Mutation regards the alteration of any currently existing iteration onto another form, existing outside the sub-mix space of children iterations reached with a crossover operator. The mutations are often random (implying openness to risk), and feature an escape from the local best feedback loop present in crossover operators. In the example of the aforementioned antennas, the mutation occurred semi-randomly: while the initial shapes were randomly generated, the following shapes attempted to expand random variations based off of previously best performing iterations (Hornby, Globus, Linden, & Lohn, 2006).

Selection operators select the best performing iterations present in the virtual space based on a predetermined criteria (Yang, 2020). In the example of the antenna, the selection operators were implemented while testing each design iteration according to the predetermined criteria of

quality of signal received. The selection operator chooses the best performing iterations based on the pre-defined evaluation threshold to make it to following generations (Câmara, 2015).

In the theoretical framework of this study, mutation operators are compared to openness to risk, while selection operators are compared to goal-orientation. We will make the point that by encouraging employees to take risks, while selecting the best work based on a directly measurable criteria, managers are likely to obtain more creative results than in a risk-averse, taste-selection environment.

Mutation has already found to be the dominant creative approach in advertising. A major study of content analysis of highly evaluated ads found that roughly 89% of those pieces respected six mutation templates (Goldenberg, Mazursky, & Solomon, 1999). A later study trained a randomly selected group of participants to create ad pieces using either of these six mutation templates, and found that they yielded significantly higher brand attitude, brand recall, and creativity than the control group. Therefore, mutation-enhancing techniques such as these 6 templates, or an encouragement to risk linked to selection operators are expected to yield the best creative performance in creative agencies.

The scope of this study addresses only the mutation and selection operators because the theoretical equivalent of a crossover operator would regard the final adjustments of craft in pieces themselves rather than an environmental human resources setup. That is, a crossover operator would correspond to a mild variation when swapping characteristics of pieces that have already been mutated. Therefore, crossover operators are left aside in favor of the environmental aspect of this study.

Evolutionary algorithms: global and local optima

One of the most important characteristics of evolutionary algorithms applied to this study is the fact that such algorithms generate and later select the best solution within neighbouring iterations (Câmara, 2015). This best solution within neighbours is known as a local optimum. The concept of a local optimum is contrasted with that of a global optimum, defined as an iteration selected for being the best-performing solution among all possible iterations. Therefore, the search process in evolutionary algorithms seeks to select the best iteration out of many, rather than the best iteration out of all possibilities.

The idea of a local optimum is a much more realistic approach for the creative industry. In a hypothetical set of an infinite amount of diverging iterations of an ad, we are much more likely to find (picking at random) a local optimum piece that meets, say, 80% of the criteria of a global optimum (that being the absolute best performing iteration of all), that the global optimum iteration itself.

That is, searching for a globally optimum advertising piece in a virtual space through mutation and selection would be a complex, time- and labor-intensive task requiring infinite resources. It is very unlikely that any team of creative employees would be able to deliver all possible iterations of a creative advertising idea in a month, let alone in a lifespan. All we can do is generate multiple groups of neighboring iterations and find the best-performing solution among them, i.e. find the local optima.

Furthermore, this local optimum also brings the advantage of a higher likelihood of applicability to other contexts, both in terms of time-decaying effects and niches, due to its

countering of over-adaptation to a particular volatile cross-section of a particular niche. This is also known in computer science as the bias/variability tradeoff. That happens because variables predictive of ad efficacy are, in their majority, normally distributed natural phenomena varying across individuals (and consequently, niches) (Hoban, 2015). So, in theory, we *would* be able to find a globally optimum ad. But it would only hold this position at the cross-sectional individual level. Infinite resources would be necessary to constantly keep track of all simultaneous global optima happening at the same time.

The interaction effect

Stemming from the aforementioned evolutionary algorithms theoretical framework, it is assumed that the optimal environment in terms of creativity will be reinforced with a managerial approach combining both high levels of openness to risk and goal-orientation. That expectation is drawn from the aforementioned parallel drawn between selector operators and goal-orientation, as well as mutation operators and openness to risk. Now, looking from a more objective perspective, we hereby establish the comparisons in a clearer manner.

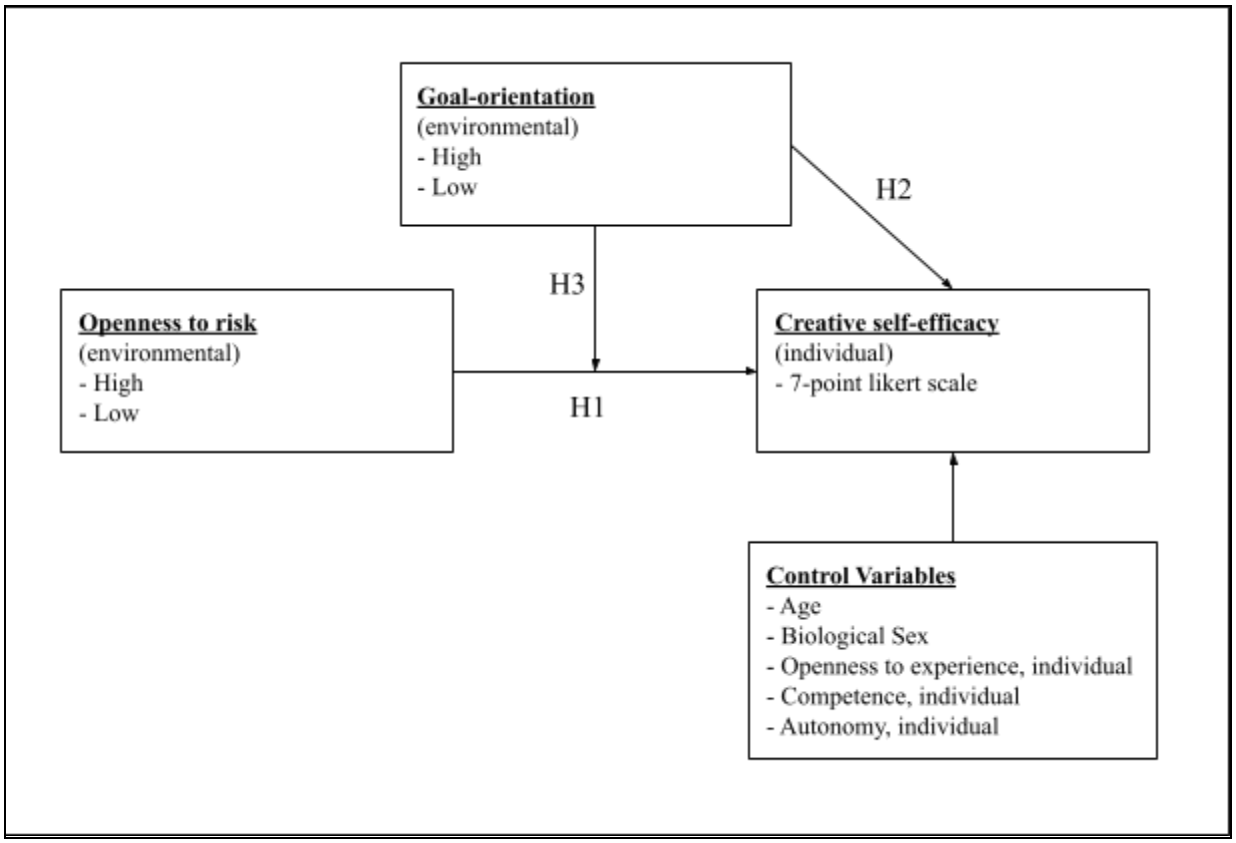
By establishing a high-quantity, risk-encouraging approach rather than a risk-averse approach, while simultaneously empirically testing a larger number of ideas, evolutionary algorithms have managed to creative highly effective solutions that no human could have ever built with such efficiency (Hornby, Globus, Linden, & Lohn, 2006). Similarly, given the expected higher levels of creativity, levels of creative self-efficacy are also expected to be reinforced.

That is, a mutation operator generating a wide spectrum of ideas is likely to generate a local optimum. And a selection operator bounded by a positivistic measure should be more successful in finding those local optima than a selection operator bounded by personal taste, experience, or intuition.

In sum, a briefing aimed at increasing sales could benefit from employees' unfiltered ideas, as long as the idea's effectiveness is empirically tested with the audience "out in the wild". These effects are expected to be especially impactful if the ideas are numerous, following divergent and unconventional artistic directions from all creative employees from throughout an entire agency. With these stances in mind, we arrive at our hypothesis:

H3: The effect of goal-orientation on creative self-efficacy is higher in managerial approaches with high openness to risk in comparison to managerial approaches with low openness to risk.

Figure 2 - The Conceptual Model



Other control variables

Both autonomy and competence have also been found to predict creative self-efficacy, and will be controlled for (Kovjanic et al., 2012; Ryan & Deci, 2000; Zhou & He, 2020). Such variables are considered personal characteristics, pertaining to the individual and are discussed below.

Competence concerns feelings of mastery, which arise when an individual feels like a competent person in the working relationship with their direct supervisor (Kovjanic et al., 2012). It is a belief regarding an individual's personal ability to reach the results desired by the manager.

In the creative industry, this feeling of mastery seems to be dependent on an employee's mastery of tools for the creation of an artistic piece. That is, knowing how to apply those tools in order to reach goals established by the supervisor.

Autonomy is defined as the ability to self-organize, in a sense of free choice without constraints outside the individual (Kovjanic et al., 2012). In a creative setting, that is translated into having a say in what happens and the ability to voice one's opinion in the working relationship with my direct supervisor.

We are choosing to measure the participants' level of openness to experience as an abundance of caution, since it has been shown to correlate with an individual's creativity (Rapp & Freitag, 2014). Therefore, we could see if feelings of creative self-efficacy are coming from participants' low creativity scores.

Biological sex and age are also accounted for as covariates as a measure of precaution, since older employees could potentially be more averse to a directive managerial approach relying on the creative directors' personal taste (that is, low levels with goal-orientation), and power dynamics might have a play in terms of perceptions of autonomy inside advertising agencies.

Methods

Design & Participants

The quantitative experiment respected a 2x2 factorial design. There were two independent variables being manipulated through conditions of two levels each: two levels for openness to risk (high and low), and two levels for goal-orientation (high and low). In order to optimize data collection, the experiment respected a mixed design: goal-orientation was tested in between subjects, while openness to risk was tested within subjects.

Table 1 - The four conditions

Condition 1	High Openness to Risk	High Goal-Orientation
Condition 2	Low Openness to Risk	High Goal-Orientation
Condition 3	Low Openness to Risk	Low Goal-Orientation
Condition 4	High Openness to Risk	Low Goal-Orientation

The data was collected in a self-reported online scenario survey, submitted to creative professionals in relevant creative hubs from around the world in the researcher's expanded personal network namely, São Paulo, and Amsterdam, among others. The collection lasted for six days during the beginning of June 2021. The locations were chosen for convenience, however it is assumed that there will not be significant differences related to local characteristics.

Participants who did not work in the creative industry were filtered out in the first question. This is an important aspect of the study because it is assumed that only participants who have already experienced the environment of a creative agency were included, and that they should have more ease when imagining the scenarios (since they would build based on their past experiences with creative directors). It is also assumed that their level of craft is relatively normalized, as it meets at least the minimum of industry standards—given the fact that they have been hired. That should contribute to the external validity of the study, since the variance in creative self-efficacy should be coming from the stimuli rather than external frames of reference. Therefore, this study should be generalizable to the entire population of employees working in the creative industry.

Stimuli

An initial set of stimuli was prepared in an attempt to yield higher and lower perceptions of both openness to risk and goal-orientation. The stimuli were then improved while exchanging thoughts with nine industry creative agency professionals with at least 3 years of experience. After that round of feedback, the stimuli were readjusted and pre-tested (see more in the following section).

The choice for imaginative scenarios was made to preserve the anonymity and certainty that the creative directors portrayed in the situations were fully fictional. That should create a "safer" environment in which participants feel that it is acceptable to fully express their thoughts of self-efficacy in relation to each hypothetical creative director featured in each scenario. It was also a way to distribute the survey online, which facilitates access to many creative employees all

round the world, especially during a pandemic. Screenshots of the stimuli can be found in the appendix A through E.

Procedures

Participants were randomly assigned to either conditions 1 and 2 (both with high goal-orientation), or conditions 3 and 4 (both with low goal-orientation). The choice for setting goal-orientation as the between-subjects factor as opposed to setting openness to risk as the between-subjects factor was made so that the scenarios would have more verisimilitude with real life situations. That is, it is much more likely that a person will encounter two creative directors working for the same agency with differing risk approaches (openness to risk) and similar filtering processes (goal-orientation) than the opposite. That is due to the fact that agencies usually feature standardized selection procedures. Meaning that if one creative director would have selected pieces based on the performance with the target audience, the other creative director working for the same agency is also likely to follow the same procedure.

In terms of the within-subjects design, participants were presented with the conditions in a randomized order, in order to balance out carry-over effects.

The survey consisted of 17 questions. Part 1 involved four demographic questions (job description, age, biological sex, email for prize raffle (optional), and five questions measuring control variables (autonomy, competence, and three items measuring openness to experience).

The first question in part 1 was a screening question to ensure all employees worked in the creative industry. It featured a visual style with animated GIFs inspired by BuzzFeed (as described later in this section) so as to engage respondents to continue filling out the survey.

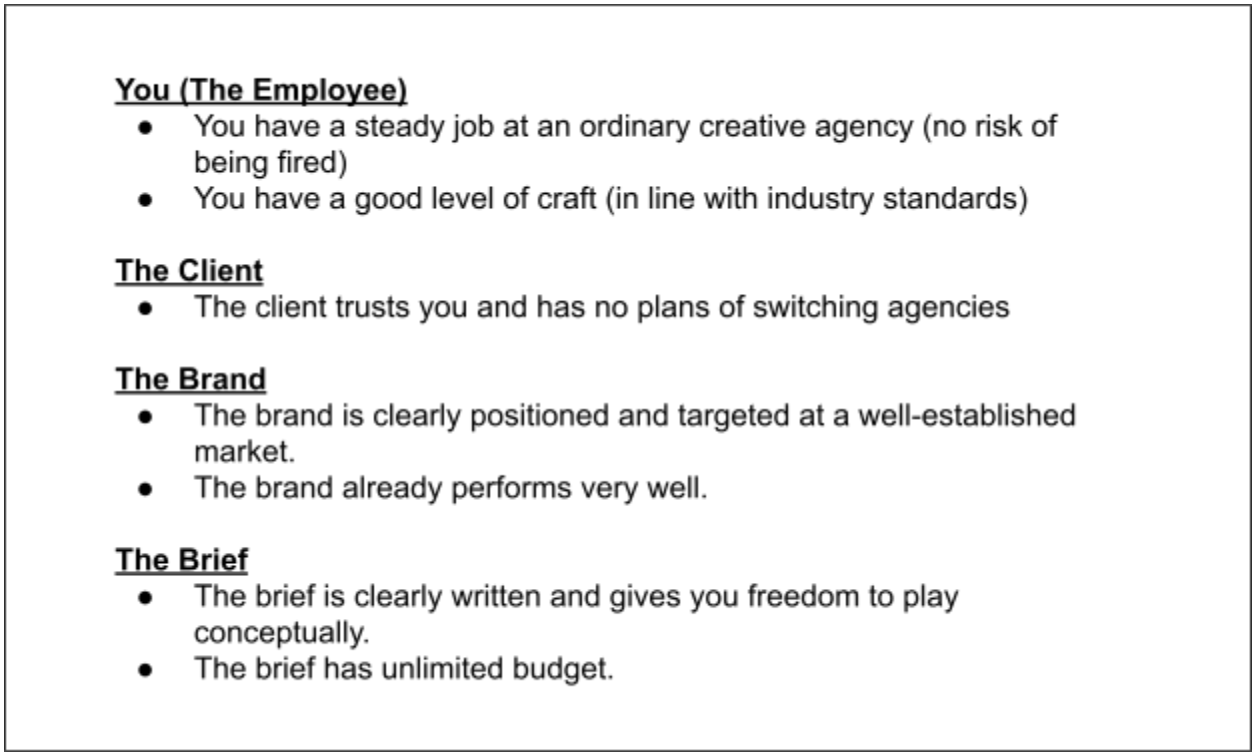
Participants who did not work in the creative industry were redirected to the end of the questionnaire.

After part 1 participants were randomly split into either of the two groups of conditions: those with higher goal-orientation, or those with lower goal-orientation. Part 2 involved the presentation of one of the 2 assigned conditions (either with high or low openness to risk being shown first), followed by four questions measuring the dependent variable (creative self-efficacy). Part 3 involved the presentation and assessment of the remaining condition, followed by another round of the four creative self-efficacy questions regarding that condition's stimuli.

Some strategies were adopted in order to encourage participants to finish the survey, such as the inclusion of a visual style similar to BuzzFeed quizzes, which have shown to be highly enjoyable to young adults (Bullock, 2014). Although, the style was not implemented alongside the stimuli or the setup of the study, due to its lower performance in information retention compared to traditional text. The only placements of BuzzFeed's imagetic visual style occurred during the introduction, filtering questions, and breaks between stimuli. The style of breaks between stimuli were kept steady throughout all conditions, so as to avoid any influence on the experiment.

The validity of this study is strongly dependent on the setup of a baseline scenario to average and ideal industry conditions. During the semi-structured interviews mentioned above, all nine industry professionals were consulted in order to reach an agreement of what average industry conditions can be defined as. The list has been incorporated to the following figure:

Figure 3 - The Stimuli Setup



Most of the baseline characteristics identified regard a control for the most common external forces that could potentially hinder creative professionals' comfort to explore riskier ideas due to the fear of external punishment or negative consequences. The baseline shown above sets an ideal scenario in terms of low pressure and denial (the creative director will say no).

Measures: dependent variable

Creative self-efficacy was measured as a four-item, 7-point likert scale ranging from "Strongly disagree" to "Strongly agree" after each of the two conditions respondents were assigned to. The scale was replicated from Tierney et al.'s study (1999), and adapted so as to

ensure that the reports were not based off of a stable personality trait, but rather reactions to each of the two within-subjects conditions. The adaptation consisted of adding "In the working relationship with this creative director" to the beginning of each item: (1) In the working relationship with this creative director I would have confidence in my ability to solve problems creatively; (2) In the working relationship with this creative director I would feel that I am good at generating novel ideas; (3) In the working relationship with this creative director I would generally have a tendency to try new approaches or methods in my work; (4) In the working relationship with this creative director I would feel that I am a good role model for creativity. The scale has shown good reliability in a later study, with a Dillon–Goldstein's rho value of .88 (Khedhaouria, Gurau, & Olivier, 2015). The Dillon–Goldstein's rho measure has been chosen as an alternative to Cronbach's alpha, with values above .70 suggesting unidimensionality (Ravand, & Baghaei, 2016). It respects the same threshold as Cronbach's alpha, and it has been considered to be an indicator at least as good as the former (Chin, 1998).

Measures: covariates

In order to assure internal validity, the study controlled for the demographic variables age (measured in absolute integers), and biological sex (measured as either male or female). Each respondents' own openness to experience was also controlled for. The scale is one of the five factors pertaining to the big five personality test, which has had many iterations (Costa & McCrae, 1992; Costa & McCrae, 2003; Gosling, Rentflow, & Swann, 2003). Our choice was to reproduce the measure in a three-item scale according to Rapp and Freitag's iteration, due to its conciseness in order to lower survey fatigue (2014). The items are as follows: (1) I am original,

and I come up with new ideas; (2) I value artistic, aesthetic experiences; (3) I have an active imagination. The respondents were asked to self-report their scores for each item respecting a 7-point Likert scale ranging from "Strongly disagree" to "Strongly agree". The scale has shown to yield a satisfactory Cronbach's alpha of .56 in the aforementioned study.

The study also controlled for the constructs of autonomy (Cronbach's alpha of .82, measured with the statement: "In the working relationship with my direct supervisor, I have a say in what happens and I can voice my opinion"), and competence (Cronbach's alpha of .84, measured with the statement: "In the working relationship with my direct supervisor I feel like a competent person"), both from study Kovjanic et al's study (2012). Both were also measured in a 7-point likert scale ranging from "Strongly disagree" to "Strongly agree", in reaction to the statements. These constructs were measured in order to control for participants' pre-existing feelings towards their relationship with their existing bosses, ensuring that no grudges from the workplace contaminate the scenarios as much.

Pre-test

A within-subjects pre-test was conducted in a sample with 26 professionals drawn from WhatsApp groups of creative employees. The first question filtered out respondents who did not work in the creative industry. While exporting the survey data set, the logs of 7 participants were not fully accessible, causing the final sample to have the complete responses of only 19 respondents. The four conditions were presented in a random order to balance out potential carry-over effects.

The pre-test survey asked participants about the environmental factors presented in each condition, and respondents were prompted to react to the following statements (measured in a 7-point likert scale, from strongly disagree to strongly agree) about their own perception of each of the constructs: (1) the statement measuring "openness to risk" was presented as follows: "this creative director is willing to explore new ideas, even if they are risky or unconventional."; (2) the statement measuring "goal-orientation" was presented as follows: "this creative director is willing to empirically test an idea with the target audience before judging it as good or bad.".

A paired-samples t-test also revealed that the stimuli in all conditions intending to prompt higher risk yielded significantly higher scores of risk perception in comparison to the conditions intending to prompt lower risk. The effect sizes ranged from d=0.64 to d=2.47, ranging from moderate to strong, being that 3 out of 4 effect sizes were deemed strong. The null hypothesis that there is no difference in risk scores across stimuli is rejected. Results can be seen in detail in the table below.

Table 2 - Comparison of all differing conditions in terms of "Openness to risk" scores

Groups compared		Mean Diff.	SD Diff.	p	d	SE	95 CI (Lower)	95 CI (Upper)	t	df
Condition 1 **High Open. to Risk** High Goal-Orient.	Condition 2 **Low Open. to Risk** High Goal-Orient.	3.12	2.62	.000	1.19	0.64	1.77	4.46	4.91	16
Condition 1 **High Open. to Risk** High Goal-Orient.	Condition 3 **Low Open. to Risk** Low Goal-Orient.	4.06	1.64	.000	2.48	0.40	3.22	4.90	10.22	16
Condition 4 **High Open. to Risk** Low Goal-Orient.	Condition 2 **Low Open. to Risk** High Goal-Orient.	1.75	2.70	.020	0.65	0.67	0.31	3.19	2.60	15
Condition 4 **High Open. to Risk** Low Goal-Orient.	Condition 3 **Low Open. to Risk** Low Goal-Orient.	2.29	2.17	.000	1.06	0.53	1.18	3.41	4.35	16

A paired-samples t-test revealed that the stimuli in all conditions intending to prompt higher goal-orientation perceptions yielded significantly higher scores in comparison to the conditions intending to prompt lower goal-orientation. The effect sizes ranged from d=1.49 to d=3.05. All effect sizes were deemed strong. The null hypothesis that there is no difference in empiricism scores across stimuli is rejected. Results can be seen in detail in the table below.

Table 3 - Comparison of all differing conditions in terms of "Goal-Orientation" scores

Groups compared		Mean Diff.	SD Diff.	p	d	SE	95 CI (Lower)	95 CI (Upper)	t	df
Condition 1 **High Goal-Orient.** High Open. to Risk	Condition 3 **Low Goal-Orient.** Low Open. to Risk	4.47	1.46	.000	3.06	0.36	3.72	5.22	12.60	16
Condition 1 **High Goal-Orient.** High Open. to Risk	Condition 4 **Low Goal-Orient.** High Open. to Risk	4.00	1.61	.000	2.49	0.38	3.20	4.80	10.55	17
Condition 2 **High Goal-Orient.** Low Open. to Risk	Condition 3 **Low Goal-Orient.** Low Open. to Risk	3.71	1.80	.000	2.06	0.44	2.78	4.63	8.51	16
Condition 2 **High Goal-Orient.** Low Open. to Risk	Condition 4 **Low Goal-Orient.** High Open. to Risk	3.18	2.13	.000	1.49	0.52	2.08	4.27	6.15	16

Distribution of the survey

The link to the survey was initially posted on Linkedin and Instagram, along with the following text: "If you work as a creative (designer, art director, copywriter, strategist, etc.) fill out my survey. It only takes 5 minutes and you also get a chance of winning a JBL GO 3". One bluetooth speaker JBL GO 3 was disclosed as a potential prize in a raffle, which contributed to responses being taken thoroughly. The speakers amounted to the equivalent of €35, and response time was accounted for when filtering the data to avoid batch responses motivated for the prize only. The shortest response time was 75 seconds, which is assumed to be enough time for a fast reader to thoroughly fill out the questionnaire. It is therefore assumed that no eventual respondents inadvertently filled out the questionnaire with the mere goal to participate in the raffle. Out of all 79 respondents, only 53 signed up for the raffle by providing their email.

Some of the distribution was snowballed with content being re-shared within other respondents' private Linkedin newsfeed, as well as WhatsApp and Facebook groups featuring advertising and design professionals who work at creative agencies. Some of the respondents were directed to the link through the researcher's personal contacts and individual cold outreach through WhatsApp.

A total of 128 responses were collected. However, 50 of those cases had either only filled out the initial screening questions, or had not completed at least one condition. These cases were filtered out. The final sample was composed of 78 employees of creative agencies (36 males, 42 females), aged between 19 and 49 (M=24.6, SD=4.19) from 11 countries. 32 respondents were from Brazil, 26 were from the Netherlands, and 12 were from other countries (USA, France, Germany, Italy, Mexico, Poland, Romania, United Kingdom).

In terms of creative positions, there were 25 designers, 14 strategists, 14 copywriters, 9 art directors, and 17 in other roles. Participants were initially assessed for the following covariates: autonomy (M=5.54, SD=1.13, Cronbach's alpha of .82), competence (M=5.56, SD=1.28, Cronbach's alpha of .84), and openness to experience (M=5.94, SD=0.72, Cronbach's alpha of .56). The participants are or have been employed at creative agencies, being on average 24 years old, and therefore most likely taking junior to mid level positions.

The pre-test survey followed the same structure as the final experiment (the exact same Qualtrics template was used for both). However, some of the text formatting differed from the final survey in font size and weight. These effects are not assumed to have had meaningful effects on the responses.

Results

Data cleaning

Data was imported from the online survey platform Qualtrics into SPSS. And the initial cleaning procedure followed the procedure described in the methods section. Biological sex was converted into a dummy variable with female being 1 and male being 0, in order to meet the requirements for being used as a covariate. Scale items measuring creative self-efficacy were averaged into one dimension-reduced variable, given that Tierney et al.'s study brought evidence to the unidimensionality of the construct (1999). Scale items measuring openness to experience were averaged into a single dimension-reduced variable, given that Rapp and Freitag's study also brought evidence to the unidimensionality of the construct (2014).

In order to check for the differences of results between countries, we conducted four independent sample t-tests between Brazil (32 participants) and the Netherlands (26 participants). Both countries were chosen for being the only country occurances with a number of participants close to a minimum of 30. There were no significant differences between average creative self-efficacy scores in either of the four independent samples t-tests conducted. Results can be seen in the table below, with their respective significance levels and effect sizes. Three out of four comparisons had weak effect sizes, whereas the comparison in condition two remained similar. Despite the high p-values showing evidence for similarity between both countries, the effect sizes might hint at the possibility of larger sample sizes yielding significant differences in future studies.

Table 4 - Comparison between average country scores (Brazil and Netherlands)

		Type of stimuli		Brazil		Netherlands		Statistics
	N	Openness to Risk	Goal-Orientation	M	SD	M	SD	p
Condition 1	35	High Risk	High Goal	5.48	1.48	5.07	1.33	.463
Condition 2	32	Low Risk	High Goal	4.11	1.72	3.23	1.51	.175
Condition 3	42	Low Risk	Low Goal	3.97	1.46	3.98	1.46	.987
Condition 4	40	High Risk	Low Goal	3.21	1.52	3.36	1.13	.757

A two-way multivariate analysis of variance was conducted with a re-coded country variable (with Brazil = 1, Netherlands = 0) as the independent variable, goal-orientation (the between subjects factor High=1, Low=0) as a moderator, and both creative self-efficacy variables (one coming from the high openness to risk condition, and the other coming from the low openness to risk condition) as dependent. Creative self-efficacy scores are two separate variables because participants reported their creative self-efficacy scores twice: once in each of the two within-subjects conditions. The results showed no significant main effect of country on either of the two dependent variables, with $F(1,54)=0.27$ $p=.605$, partial $\eta^2 = 0.01$ for the high openness to risk conditions, and $F(1,54)=0.82$ $p=..37$, partial $\eta^2 = 0.02$ for the low openness to risk conditions. There were also no significant interaction effects of goal-orientation and country on either of the dependent variables, with $F(1,54)=0.29$ $p=.590$, partial $\eta^2 = 0.01$ for the high openness to risk conditions, and $F(1,54)=1.69$ $p=.199$, partial $\eta^2 = 0.03$ for the low openness to risk conditions. Therefore, no differences in creative self-efficacy between the countries of Brazil and the Netherlands have been found in association with the conditions of this study.

Analysis of Variance

In order to test the three hypotheses, we conducted a repeated measures analysis of variance with openness to risk (within subjects) and goal-orientation (between subjects) as independent variables and creative self-efficacy as a dependent variable. Since the within-subjects factor only involved two levels, there was no need for a sphericity test.

The analysis showed a significant weak main effect of goal-orientation on creative self-efficacy, $F(1,64)=17.59$, $p=.011$, partial $\eta 2 = .10$, but no significant main effect of openness to risk on creative self-efficacy, $F(1,64)=0.059$, $p=.809$, partial $\eta 2 = .00$. Participants who were exposed to high goal-orientation scenarios had higher creative self-efficacy scores, in comparison to low goal-orientation scenarios. We have, therefore, found support for H2. Participants who were exposed to higher openness to risk scenarios did not differ from those exposed to lower openness to risk scenarios. We have not found support for H1.

Conversely, the analysis showed a significant interaction effect, moderate in size, between openness to risk and goal-orientation, $F(1,64)=5.22$, $p=.026$, partial $\eta 2 = 0.08$.

It is important to highlight that the main effects shown above, however, do not discriminate according to study conditions. In order to interpret more nuanced results, we have also conducted a simple main effects analysis.

The simple main effects analysis showed that there was no main effect of openness to risk on creative self-efficacy in scenarios with low goal-orientation $F(1,69)=3.02$, $p=.087$. That is, there was no significant difference between high and low openness to risk scenarios when presented alongside low goal-orientation.

However, there was a significant main effect of openness to risk on creative self-efficacy in scenarios with high goal-orientation $F(1,69)=37.90$, $p<.001$. That is, there was a significant difference between high and low openness to risk scenarios when presented alongside high goal-orientation.

The simple main effects analysis also showed that there was no main effect of goal-orientation on creative self-efficacy in environments with low openness to risk $F(1,69)=0.51$, $p=.476$. That is, there was no significant difference between high and low goal-orientation scenarios when presented alongside low openness to risk.

However, there was a significant main effect of goal-orientation on creative self-efficacy in environments with high openness to risk $F(1,69)=16.09$, $p<.001$. That is, there was a significant difference between high and low goal-orientation scenarios when presented alongside high openness to risk.

Therefore, the effect of goal-orientation on creative self-efficacy was shown to be higher for employees in environments with high openness to risk than for those in environments with low openness to risk. We have, therefore, found support for H3. Please check the interaction means plot below.

Conversely, the effect of openness to risk on creative self-efficacy was shown to be higher for employees in environments with high goal-orientation than for those in environments with low goal-orientation.

Figure 4 - Box Plot Showing Interaction Effect

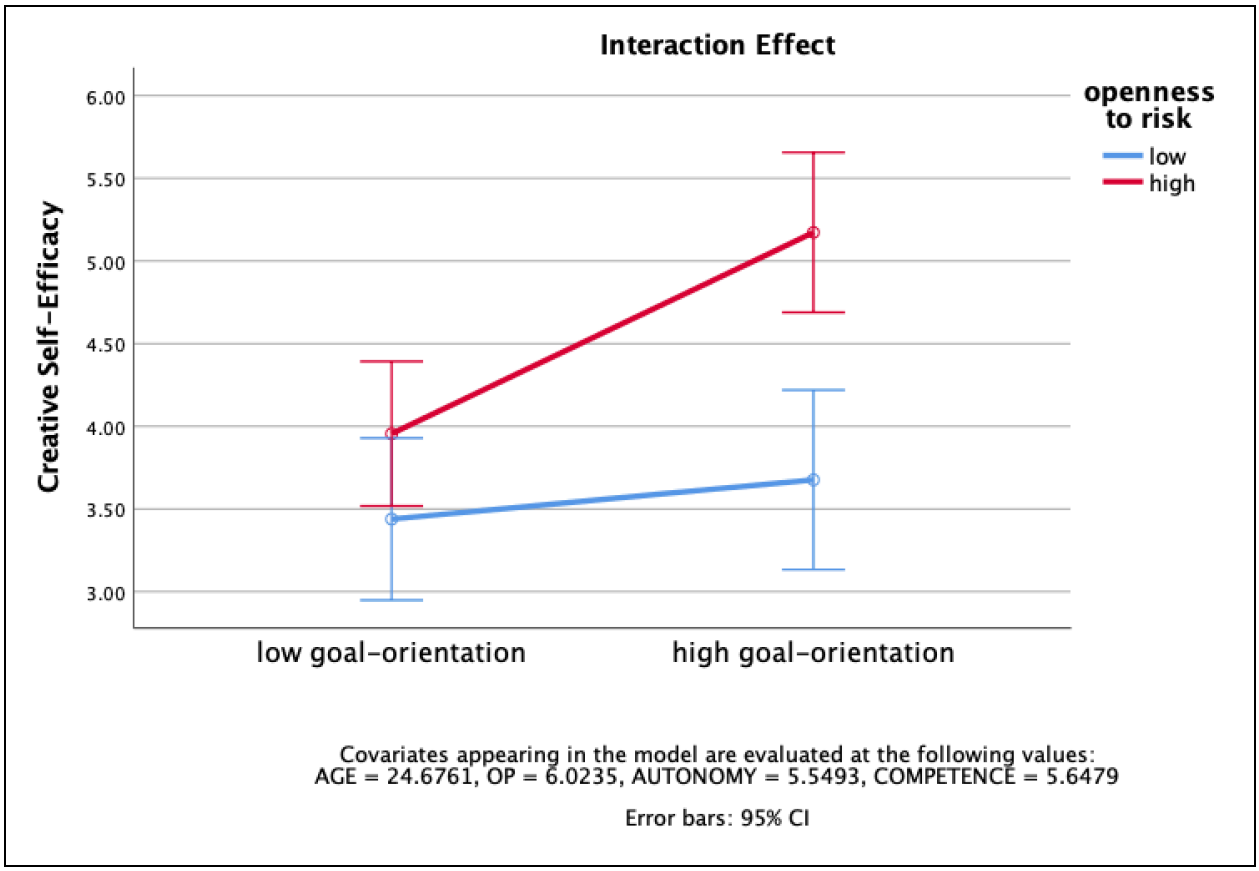
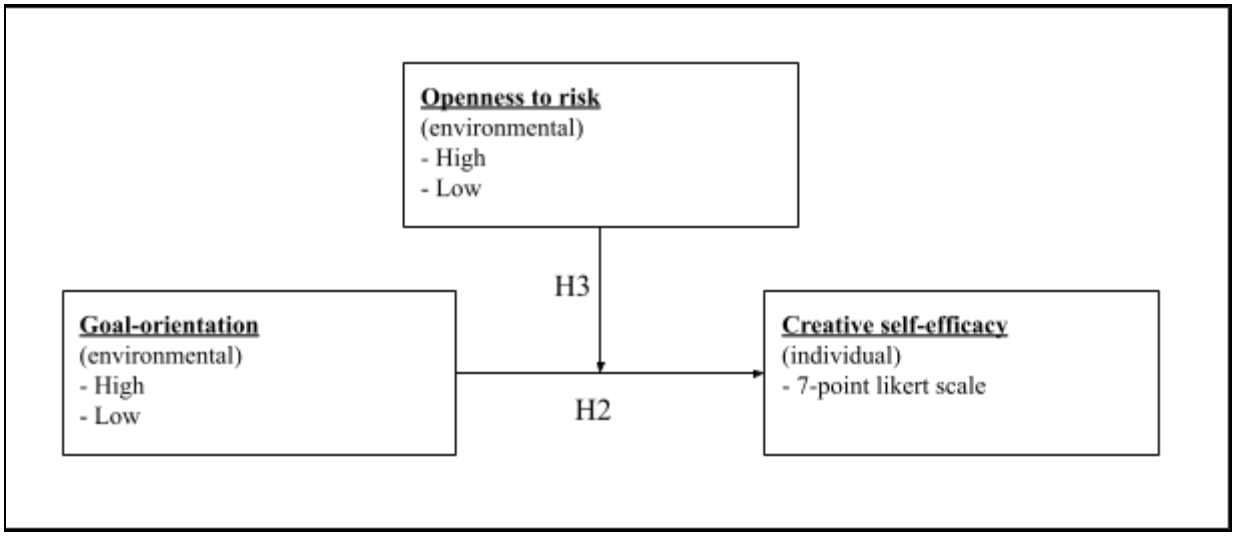


Table 5 - Simple Effects Results

Factorial group	Main effect	p
Low Goal-Orient.	**Openness to Risk**	.087
High Goal-Orient.	**Openness to Risk**	.000
Low Open. to Risk	**Goal-Orientation**	.476
High Open. to Risk	**Goal-Orientation**	.000

Therefore, we found support for H3 that there is an interaction effect between openness to risk and goal-orientation. It is important to highlight that out of the four scenarios presented in the plot, the bottom three have overlapping confidence intervals—as shown in the box plot above.

Figure 5 - The Tested Conceptual Model



In terms of covariates, linear regressions were conducted to check if either separate predicted creative self-efficacy. None of the covariates had any significant effect. The statistics are shown in the table below. Please notice that the analyses were conducted separately and manually combined into this table.

Table 6 - Covariates Predicting Creative Self-Efficacy

Source	df	F	Sig.	η2
Age	1	0.31	0.58	0.00
Autonomy	1	0.20	0.655	0.00
Competence	1	2.23	0.14	0.03
Biological Sex	1	3.78	0.056	0.05
Openness to Experience	1	0.13	0.723	0.00
Error	65			

Conclusion

Discussions

The results of this study represent a small yet relevant step in the direction of a new procedural framework for creativity management in creative agencies. With the initial research question in mind, we conclude that the research objective of analyzing the impact of openness to risk and goal-orientation on creative self-efficacy has been reached. High managerial goal-orientation has shown to be a fundamental characteristic for a more creative environment, especially in agency environments that also incorporate high openness to risk.

This represents a relevant counterpoint to Gu, He, and Liu's graduate school study in China (2017), highlighting the need to contextualize results in terms of the research on creative environments.

The reinforcement of the effects of goal-orientation and openness to risk is in line with David Ogilvy's maxims presented in the introduction, and the theory that this setup yields higher creativity. One remaining question is whether creative self-efficacy holds up as a mediator between openness to risk and employee creativity, as well as between goal-orientation and employee creativity. Further investigation in that topic should bring more clarity to the mechanisms happening behind the scenes.

It is also important to highlight that both stimuli in this study featured a creative director throwing out participants' ideas. Regarding this characteristic of the study, the results show two relevant findings.

Firstly, even though participants had their ideas turned down, our ideal condition still yielded significantly higher levels of creative self-efficacy than other conditions. Also, all of the

other three conditions did not significantly differ from each other (at least with this sample size). Future research could go further and compare conditions with an idea being approved vs. an idea being turned down. It could be, for example, that the procedural framework presented here (in the ideal scenario) does not yield any significant differences between ideas being approved or turned down.

Secondly, that the effect size between the highest performing condition and all other conditions has shown to be relevant even though the stimuli applied a mass-media view of a single target audience. Further research could also look into comparisons between different managerial media landscape views (single-channel vs. multi-channel).

Further research should look into which role autonomy and competence play in this framework in combination with the Self-Determination Theory (Bakker, & van Woerkom, 2017; Kovjanic et al., 2012; Zhou & He, 2020). It could be that higher levels of creative self-efficacy stem from higher feelings of competency, because they believe that the search is now not regarding a global optimum, but rather a local optimum. That is, that they feel that the goal is more reachable.

Furthermore, this framework yields a higher creativity-related outcome. A comparison of different procedural frameworks in creative agencies could also identify that other methods are better at yielding ad efficacy, for example.

Limitations

Using sales as the particular criteria to this study might have lowered the effect size between conditions because some respondents reported thinking that good advertising does not

necessarily need to sell (therefore disagreeing with the measure chosen by the creative director). It could be that a pre-agreement between manager and employees in terms of the performance measure could yield even better results.

Also, given the small sample size in this experiment (only around 32 participants per condition), a study with a larger sample size might be able to highlight more nuances in the data.

Furthermore, the stimuli for risk did not yield variances as large as goal orientation. The lack of a main effect for openness to risk might have been caused by a confusion in some of the participants' interpretation of the stimulus. Future research could find alternative ways of stimulating risk that might or might not yield a main effect.

Another limitation is that the goal-orientation stimuli were always presented to the respondents after the openness to risk stimuli (inside each condition, check appendix). This order might have caused carry-over effects that should be looked into in future research.

Managerial implications

When creative directors move away from the idea that there is such a thing as one right way of making creative pieces, they let go of a hierarchy in idea selection bounded by expertise. Consequently, employees feel they are more capable at tackling a creative task. That also seems to cause employees to feel intrinsically motivated, given that when following the procedural framework presented in this study, creative directors manage to take close to full advantage of each employees' creativity.

Although this study does not properly address the application of the idea of niches into the experiment, this "taking full advantage of an employee's creativity" is of extreme relevance

due to its economic feasibility in the current media landscape. That is, when testing risky ideas with the public you are likely to find a niche to which that idea appeals to. This also allows for multiple types of "creativities" to thrive (Wei, & Chokshi, 2021).

Most importantly, these results seem to demonstrate the ability of creative environments making use of this framework to democratize access to creativity, and empower more people to feel creatively able. That goes in line with the idea from IDEO founders Kelley and Kelley, that when it comes to creativity, there is no such thing as an "expertise" or a "geniality": there is persistent experimentation (2015).

Furthermore, the results show that giving creative employees space to take risks is not enough if the managerial decisions are still made without an empirically objective criterion for idea selection. Looking through the lens of this framework, the full potential of a risk-encouraging creative environment can only be unleashed with test-based selection. That is, it seems that when the managerial selection of ideas relies more on arbitrary standards, most of the autonomy given to the creative employee to think divergently gets hindered.

One important caution to managers is that this result might not be economically applicable in all contexts. Firstly, because the transition to a multi-channel media landscape has just begun, and many creative tasks still require single-channel mass-media approaches. Therefore, this procedure might not be ideal for applications such as television ads, newspaper ads, or out of home and billboard ads.

This framework does seem to be ideal for more dynamically targeted media such as Google Ads or TikTok Ads, linked to an intention to test ideas early on (without any

pre-selection) and fail many times. Taking more risk while constantly testing is arguably an easier way to reach virality, by not letting "good ideas die young".

With that, this study invites you to reflect on the role of a creative director in a media environment where the public is so widely segmented. The optimal function of a creative manager seems to transition from a directive into a more transformational and horizontal style of leadership, fostering an environment where all ideas have their value. Because at the end of the day, every idea does. They just need to find their (niched) space.

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Appendix

Appendix A: Stimuli - The Initial Setup

Now Let's Get Going. Imagine This Setup:

You

- You have a steady job at an ordinary creative agency (no risk of being fired)
- You have a good level of craft (in line with industry standards)

The Client

- The client trusts you and has no plans of switching agencies

The Brand

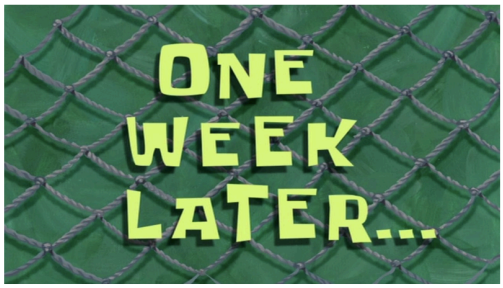
- The brand is clearly positioned and targeted at a well-established market.
- The brand already performs very well.

The Brief

- The brief is clearly written and gives you freedom to play conceptually.
- The brief has unlimited budget.

Appendix B: Stimuli - Low Goal-Orientation

Imagine You've Worked On These Ideas For A Week...



...And They Got Rejected.

"Creative Director B" Reacts To Your Work, Saying:

"Your work is in line with the brand. But we are not going to go with these ideas."

When you ask why, "Creative Director B" says:

"I have over 20 years of experience. I can tell what good work is in this industry. These ideas are not going to resonate with the target audience."

Appendix C: Stimuli - High Openness to Risk

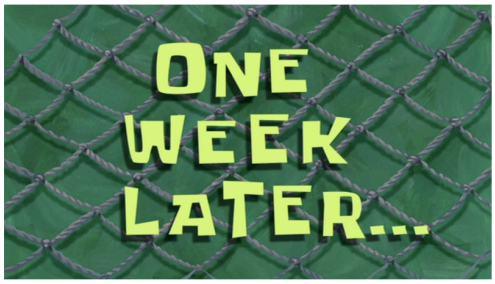
“Creative Director A” Asks You To Come Up With As Many Creative Pieces As You Can Think Of In The Timespan Of A Week.

The Creative Director's e-mail reads:

- Dare to show me your riskiest ideas.
- Try your best to innovate.
- Think outside of the box.
- The sky is the limit.
- It's OK to deliver outside of industry standards.
- It's OK to hand in unfinished ideas.
- It's OK to fail.

Appendix D: Stimuli - High Goal-Orientation

Imagine You've Worked On These Ideas For A Week...



...And They Got Rejected.

"Creative Director B" Reacts To Your Work, Saying:

"Your work is in line with the brand. But we are not going to go with these ideas."

When you ask why, "Creative Director A" says:

"We hired specialists from a research agency to test your work with the target audience. These ideas did not sell well with the target audience."

Appendix E: Stimuli - Low Openness to Risk

“Creative Director B” Asks You To Come Up With As Many Creative Pieces As You Can Think Of In The Timespan Of A Week.

The Creative Director's E-mail Reads:

- Show me conventional ideas.
- Don't try to reinvent the wheel.
- Just stick to the traditional.
- Make sure you stay down to earth.
- It's NOT OK to deliver outside industry standards.
- It's NOT OK to hand in unfinished ideas.
- It’s NOT OK to fail.

However, most importantly, the best creative self-efficacy performance can be achieved when associating both

- The hypothesis proposes that, following dominant aesthetic systems (either stemming from a euro-centric contextualist epistemological perspective or an institutional tenacious belief), over following an empirical, goal-oriented aesthetic standard hinders employee creative self-efficacy.
- So again, we bring more evidence to the two principles presented in the first paragraph: (1) dare to test absurd and divergent ideas (by having more ideas), and (2) implement an ongoing, boundless, uncensored process of trial-and-error limited only by each creative piece's ability to meet the desired outcome measures

. More innovation, more creativity, more effectiveness.

That goes in line with David Ogilvy's second prescriptive principle presented in the first paragraph: (2) that creative agencies should engage in an ongoing, boundless, uncensored process of trial-and-error limited only by their ability to meet the desired outcome measures.

o criativo indivíduo pode ser míope -> responder com evolutionary algoritmos
dc vai ver a adequação nos mais diferentes quesitos (que podem ser empíricos)

What makes the status quo (of risk-aversion)

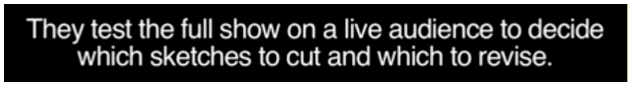
There seems to be a trade-off between giving creatives full autonomy and the commercial viability of an idea (Tierney & Farmer, 2002). And that concern of viability seems to be linked to

a hierarchical relationship with clients and managers (Koslow et al., 2006), as both are perceived as more risk-averse by lower-level creative employees than themselves (El-Murad & West, 2003; West & Berthon, 1997). They have a lot to lose, so that's not surprising.

So what often happens is fear: sophisticated, high-ranking clients have shown to induce fear throughout agencies, diminishing creative potential (Koslow et al., 2006). But not all creative directors pass this fear onto creatives. Top-management has shown to be ambiguous: at times contributing to the creative work, and at times inducing fear (Koslow et al., 2006).

But this hierarchical relationship with clients is only negative with highly demanding ones (Koslow et al., 2006). Non-demanding clients in high hierarchical positions tend to correlate with campaign with higher creativity scores. Most importantly, the barrier to hierarchy seems to disappear when the clients are open to explore new ideas, yielding the largest effect size creativity-wise in Koslow et al.'s study (2006).

SNL as an example of forever creativity critically acclaimed
abertura, risco, e seleção com público na reading table e depois com público no rehearsal
9 IDEIAS DE 50 MAKE THE CUT (mas isso é arbitrariedade de CD, deixar de lado se pá)



- o estudo em que as seis pessoas performaram bem

However, as opposed to what Ogilvy says, advertising is not that much of an art (the 6 template study taught to random people), evaluated by the "miraculous dicksucking view of creative directors", aka os únicos detentores da verdade.

It is measured according to the 4-item scale with item sample "when I'm at work, I can always manage to solve difficult problems (if I try hard enough)" (Tierney et al., 1999).

Such variables are considered personal characteristics, pertaining to the individual and are discussed below.

No single research method has been widely adopted by agencies (Heath & Feldwick, 2008). Some agencies have taken steps in the direction of evolutionary algorithms with goal-oriented approaches such as the aforementioned A/B testing and copy testing. WPP, the world's largest agency conglomerate, has gone even further by implementing the view of cultural niches. Assisted by data-driven, highly tailored media buying, the group has declared an intention to steer clear from a mass media approach (Deighton, Kornfeld, & Pietrella, 2016).

However, at least when looking at WPP's approach, there seems to be no

It sees the value in each piece of content. It understands why which type of content is appealing to each kind of audience. Because, at the end of the day, with internet's democratization, more and more people are having access to niche chains of content. And more than ever before, tastes are as wide (divergent) as one can possibly think of. Because there's always someone on the other side of the globe who will enjoy the same type of content as you.

There is less and less need for anyone to understand what the principles are, giving full room for innovation at the ideation stage.

- It's more cost effective to test (ROI), than to rely on a CD's personal standards IN CERTAIN SITUATIONS.

What could be different

These findings go in line with the core beliefs of IDEO (a design agency that has worked for innovative giants such as Apple and Nike): that there is no such thing as a "best" design direction, but there are rather only two types of design directions: ones that meet outcome expectations more, and others that meet less (Kelley & Kelley, 2015).

Let us imagine the task of finding the best performing advertising piece for a campaign. Replicating a multi-channel assumption of individualization, we would aim for a number of global optima ads equivalent to the total number of people in our target audience (Deighton, Kornfeld, & Pietrella, 2016). We

- Consequences of not addressing employees intrinsic motivation
  - The problem with managers not respecting a goal-orientation is that it seems to hinder creativity through keeping the keys to solving the problem in the hands of the manager, therefore decreasing employee perceptions of

> self-efficacy. That is, the employee would be much less likely to be rewarded for finding a creative or innovative solution (especially if it contradicts the manager's belief for a single imperatively dominant aesthetic standard).

This paper shows that another key element of implementing a "fail fast" approach in agencies, besides higher creativity, yields an outcome related to higher flow and job satisfaction and motivation of employees. Not doing this in the long run makes people unmotivated and underperform.

    - TikTok's democratic algorithm also seems to go in that direction. As opposed to Instagram's feed and YouTube's algorithms, that tend to stick to more conservative content that is more likely to engage with more people (but not necessarily as much with a particular individual / one-size-fits-all), TikTok's algorithm is a machine hunting fish with big nets. TikTok's algorithm is constantly trawling through every corner of the social network, looking for underdog content to try out with new random niche audiences.
        - That results in more content going viral more often with less overall views (in comparison to YouTube for example), however with much more tailored content, which generates higher engagement.
        - The idea here is that TikTok's algorithm isn't particularly biased towards a certain type of content, being uniquely guided by empirical A/B testing. And with such approach, TikTok manages to deliver content that's both more appealing and more edgy (and probably one because of the other).
        - Similarly, we could apply this world view to the creative industry.
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    - It's much more common to go viral (YouTube is too aristocratic)
    - Assisted evolution, free market dynamics
    - This is the first time that a social network has cracked into a completely different culture.

- Created in China by a small team, the app managed to "crack" the cultural code of niches all around the world in places of the world that they had very little understanding of.

Let us refer back to the antenna example. The process of designing antennae with optimal performance is both time and labor intensive, requiring a significant amount of domain knowledge. But evolutionary algorithms have been found to be more effective than experts in developing new shapes. Mutation operators function without any prior knowledge regarding the objective, and often yield better results than human labor (antenna).

In the same way that finding the global optimum antenna design for a certain aeroespacial application is extremely laborious

for all aeroespacial applications, there is no best design for an internet display ad that works with all cultural niches (Bentley, & Corne, 2002).

Evolutionary algorithms start with random samples (Câmara, 2015). If such starts completely randomly and it gets somewhere, imagine how much a diverse creative team would be able to achieve with all of their intuition.

Quantity has shown to beat quality in terms of innovation (Kelley & Kelley, 2015). This is relevant because the more innovative an advertising piece is, for example, the higher the chance that it both captures attention from the audience and that it sticks to their memories (Pieters et al., 2002). Having more ideas also means having more effective ones (Bruce G. Vanden Bergh et al., 1983). These results have been exhaustively tested (Kelley & Kelley, 2015).

So much so, that the effectiveness of many advertising pieces ends up being extremely low due to their lack of respect for basic empirical principles of the advertising practice (Armstrong, 2010).

those goals are often not specified by a numerical range. For example, instead of clarifying an intention to increase market share by 4%, a client will merely set "market share increase" as a campaign objective.

Even though client briefs usually express measurable campaign goals (Blakeman & Taylor, 2019), only 30% of campaigns generate a powerful effect in the short term (Cramphorn, 2004).

Without this specificity and measurability of client goals, creative directors do not have the ability to

Therefore, one could assume that perceived lower levels of openness might negatively predict the creative individuals' autonomy. That goes in line with David Ogilvy's prescriptive principle presented in the first paragraph: (1) that creative agencies should have the courage to consider absurd ideas.

- Believing in a "monolithic standard to advertising or design" is being in line with a reality that (will) no longer exist in the future. The new generations have shown that, and they are here to stay. Television is no longer the center of the world, so **why would we pretend that there is such a thing as a main dominant cultural aesthetic**? There isn't one. There is only pieces that work with the target audience and pieces that don't. Period.
- Despite the argument that EU is creating a collective culture (https://www.economist.com/europe/2021/03/31/how-netflix-is-creating-a-common-european-culture), that's not the same monolithic entity as television in McLuhan's work. What we have now are Netflix niches, more shows with more edgy content (the article mentions Bavarians, a show with nudity, etc).

The idea of evolutionary algorithms points in the direction that with great and widespread capacity for empirical testing, the value of a "quality monolithic judgement" is less and less necessary.

- Because nowadays the gap between quality strategized production and trial-and-error, black-box machine learning is getting smaller. It takes less and less time for you to just go and test prototypes out in the wild instead of engaging in long and tiresome processes of R&D. That's in fact one of the maxims proposed by Eric in The Lean Startup.

        - CDs rams os "detentores da cultura pop" SÓ QUE ELA NÃO EXISTE MAIS TLG (e eles não são todos os nichos ao mesmo tempo)
        - We don't need "pop culture gatekeepers" creative directors
        - Trend de multi facetado targeting de campanha (HBR mad to math)
    - So why would you ever listen to a creative director who claims to know what the best artistic direction to a campaign is? The truth is that: there is no best artistic direction, because the public is so widely segmented (no longer mass media). Segmented communication is the best, because it makes use of an idea's full potential, linked to a niched audience's full expectation to consume that type of content.

This study proposes a shift from concurrent-development research (gathering data while developing the pieces) onto post-development testing (testing and choosing the best performing out of several executions of a campaign) (Leckenby & Plummer, 1983).

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- What has been called a creativity network effect: every creative impacts the rest of the network, who in turn create variations of their initial creation.

- It's hard to originate ideas, but it's easy to remix and build on top of other ideas.
- You can go there and find inspiration. Duets, etc.
- Discover page tracks trends as you speak.
- No aristocracy. You're always being shown something that has been tested on an audience.
- Survival of the fitest.
- Social following has a higher noise to signal ratio.
- TikTok is not always leaving things open to chance: they do have paid sponsorships

Task complexity seems to positively predict creative self-efficacy (Tierney & Farmer, 2002). So, in theory, the bigger the challenge, the bigger the self-efficacy. But this is only valid in conditions where

Most of this systematic disregard for empiricism is linked to axiomatic findings exhaustively replicated over the years. Armstrong has gathered most of the empirical advertising principles found in years of academic studies in his book "Persuasive Advertising" (2010). However, the aphorisms presented in his book are often broad in the sense that they mostly address the overall format of an ad rather than the content of ads themselves.

For example, a meta-analysis of 77 studies shows that comparative advertising yields a 22% increase in purchase intention compared to non comparative advertising in utilitarian, high

involvement products, with a small market share (Grewal et al., 1997). The study also concludes that the announced product should be populating most of the ad space. However, this does not particularly assess the innovative or creative ability of a campaign. THESE PRINCIPLES REFER MOSTLY TO HYGIENIC FEATURES OF AN AD.

That is not enough to test an idea, which is what i'm presenting here.

But why are clients switching? The top five criteria for choosing new agencies found in a 1995 survey study are, in descending order, an agency's: good (1) creative skills, (2) marketing skills, (3) strategic skills, (4) media skills, as well as (5) a "proven track record of results" (Henke, 1995).

So even though creativity is the number one agency criterion for clients, the other four criteria are related to effectiveness in results. That is, it is not enough for an agency to be creative. An appropriate balance between creativity and economic impact must be reached.

But how can we ensure that agencies are reaching optimal economic impact with each campaign?

Qualitative methods have been widely used to back up strategic directions. Copy testing is one example of a practice adopted in the last few decades, in which different variations of taglines are tested with the target audience (Leckenby & Plummer, 1983).

The contextuality of each creative brief makes it hard for a unified research model across all campaigns at all agencies.

The self-determination theory and employee creativity

Competence and autonomy are relevant to this study because they are predictors of employee creativity, defined as the measured results (meaning ideas, products, or procedures) that are useful and bring originality to an organization (Zhang et al., 2018; Zhou & He, 2020). Please notice that relatedness (a self-determination theory variable) has been omitted from the model as it falls outside the scope of this study.

So how do we maintain creative self-efficacy? Looking through the lens of the Self-Determination Theory (a theory that posits the predictors of intrinsic motivation as being: relatedness, competence, and autonomy), creative self-efficacy has shown to be predicted by competence and autonomy (Kovjanic et al., 2012; Ryan & Deci, 2000; Zhou & He, 2020). That is, if a manager gives their employees the power to make decisions about the specifics of their occupation, employee autonomy goes up. If managers also make sure the employees feel like they know how to deliver what is being asked of them tools-wise, the employee's competence goes up as well. High levels of competence and autonomy will then cause employees to believe in their own ability to solve difficult creative problems at work (self-efficacy).

But how are employees supposed to know *how* to deliver an artistic piece if the criteria for the end term keeps shifting in ambiguity depending on the clients' particular taste or the creative director's mood? Advertising is deemed as a knowledge work (Latham & Yukl, 1975). As opposed to a blue collar worker assembling a car, there are no agreed-upon premises as to what a creative should deliver as an art director, for example.

So while developing art pieces, creatives co-exist with the possibility of a managerial or client rejection —which usually means reworking ideas from scratch. This might not be so constructive to CSE. So, there seems to be an ongoing concern affecting agency creatives as to how much of their risk-taking and autonomous creativity can be poured into each project —and whether that would be perceived as viable or not.

One of the ways to ensure a sane application of evolutionary algorithms is quantity. That is, goal-orientation and openness to risk both need an environment with a considerable amount of initiated pieces in order to thrive. For example, the six most performed scores worldwide in the past years also happen to have been written by the top six composers measured in the number of pages written in their lifespan (Bachtrack, 2017; Scherer, 2008). That is, the composers that engage in bulk (quantity) trial-and-error (goal-orientation) with the most divergent possibility of ideas (openness to risk) tend to have a better resonation with the public. Put simply, quantity is one of the ways to ensure that creative employees are delivering risky ideas in the batch.

Both the clients' and the creative director's volatile tastes—sometimes favorable to creative employee's ideas, other times not so much—do not seem to contribute to a perception of openness to risk, as noted in the reports from creative employees (Fujioka, 2020).

So even though intuition is an inevitable piece of the ideation process in advertising —take it as the initial population of iterations running through an evolutionary algorithm (Gaertner, 2010),

not be exactly helpful when applied as a selection operator due to th.

However, after a vast population of a virtual space using mutation methods,

One example of poor performance linked to a selection operator based on taste is that creatives prompted with a pottery task of making the "best quality vases" will perform significantly worse in terms of creativity output than the group prompted with the task of making "as many vases as possible" (Kelley & Kelley, 2015). That is, each of the participants in this study assigned to the "best quality vase" (low goal-orientation) condition actively seeked to filter their output based on their own personal taste, as opposed to the "many vases" condition.

These results are only going to be applicable for people thinking under a creating style, who have a tendency to engage in risky, unconventional ideas.

That is not to say that there is no effective empirical testing in agencies at all. There is. However, thanks to the mass-media world view, agencies tend to test based on a general model

of the population, or at best a few demographic or behavioral segment splits (Sahin, Balogly, & Topcuoglu, 2020). And these tests usually feature a small number of stimuli for comparison. For example, copy testing (testing different taglines with the target audience) involves iterating based on pieces previously selected by the creative director.

Deep learning creates very organic designs. Organic in the sense of nature-like. And it only works for machines because they do have one DIRECTLY MEASURABLE POSITIVIST DESIRED OUTCOME.

AutoDesk's Dreamcatcher Research.