An aerial photograph of a city skyline, likely New York City, featuring several prominent skyscrapers. The sky is a pale, hazy blue. The buildings are densely packed, with a mix of architectural styles. A large, dark, angular skyscraper is a central focus. The overall tone is somewhat muted and artistic.

SPEAKING THE LANGUAGE OF CREATIVITY: CREATIVE IDEATION IN A SECONDARY LANGUAGE

Simon Blanchette

HEC MONTRÉAL

Title of Thesis:
Speaking the Langue of Creativity:
Creative Ideation in a Secondary Language

By: Simon Blanchette

Administrative Science
(Strategy)

A Thesis Submitted
in Partial Fulfillment of Requirements
for a Master of Science
in Administration

October 2018
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May 29, 2017

To the attention of:
Simon Blanchette
HEC Montréal

Re: Ethics approval of your research project

Project No.: 2018-2699

Title of research project: How does bilingualism impact creativity: An experimental approach using construal level theory and psychological distance.

Your research project has been evaluated in accordance with ethical conduct for research involving human subjects by the Research Ethics Board (REB) of HEC Montréal.

A Certificate of Ethics Approval attesting that your research complies with HEC Montréal's *Policy on Ethical Conduct for Research Involving Humans* has been issued, effective May 29, 2017. This certificate is **valid until May 01, 2018**.

Please note that you are nonetheless required to renew your ethics approval before your certificate expires using Form *F7 – Annual Renewal*. You will receive an automatic reminder by email a few weeks before your certificate expires.

If any changes are made to your project before the certificate expires, you must complete *F8 – Project Modification* and obtain REB approval before implementing those changes. If your project is completed before the certificate expires, you must complete Form *F9 – Termination of Project* or *F9a – Termination of Student Project*, as applicable.

Under the *Policy on Ethical Conduct for Research Involving Humans*, researchers are responsible for ensuring that their research projects maintain ethics approval for the entire duration of the research work, and for informing the REB of its completion. In addition, any significant changes to the project must be submitted to the REB for approval before they are implemented.

You may now begin the data collection for which you obtained this certificate.

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REB of HEC Montréal

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This is to confirm that the research project described below has been evaluated in accordance with ethical conduct for research involving human subjects, and that it meets the requirements of our policy on that subject.

Project No.: 2018-2699

Title of research project:

How does bilingualism impact creativity: An experimental approach using construal level theory and psychological distance.

Principal investigator:

Simon Blanchette,

Research director(s):

Marine Agogue
HEC Montréal

Date of project approval: May 29, 2017

Effective date of certificate: May 29, 2017

Expiry date of certificate: May 01, 2018



Maurice Lemelin
Président du CER de HEC Montréal

Le 30 avril 2018

À l'attention de :
Simon Blanchette
HEC Montréal

Projet # 2018-2699 – Linguistic and Creativity

Titre : How does bilingualism impact creativity: An experimental approach using construal level theory and psychological distance.

Bonjour,

Pour donner suite à votre demande de renouvellement, le certificat d'approbation éthique pour le présent projet a été renouvelé en date du 01 mai 2018.

Ce certificat est valide jusqu'au 01 mai 2019.

Vous devez donc, avant cette date, obtenir le renouvellement de votre approbation éthique à l'aide du formulaire *F7 - Renouvellement annuel*. Un rappel automatique vous sera envoyé par courriel quelques semaines avant l'échéance de votre certificat.

Si votre projet est terminé avant cette échéance, vous devrez remplir le formulaire *F9 - Fin de projet*.

Si des modifications importantes sont apportées à votre projet avant l'échéance du certificat, vous devrez remplir le formulaire *F8 - Modification de projet*.

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Nous vous souhaitons bon succès dans la poursuite de votre recherche.

Cordialement,

Le CER de HEC Montréal

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La présente atteste que le projet de recherche décrit ci-dessous a fait l'objet d'une évaluation en matière d'éthique de la recherche avec des êtres humains et qu'il satisfait aux exigences de notre politique en cette matière.

Projet # : 2018-2699 - Linguistic and Creativity

Titre du projet de recherche : How does bilingualism impact creativity: An experimental approach using construal level theory and psychological distance.

Chercheur principal :

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Date d'approbation du projet : 29 mai 2017

Date d'entrée en vigueur du certificat : 01 mai 2018

Date d'échéance du certificat : 01 mai 2019



Maurice Lemelin
Président du CER de HEC Montréal

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Projet # : 2018-2699 - Linguistic and Creativity

Titre du projet de recherche : Speaking the Language of Creativity: Creative Ideation in a Secondary Language

Chercheur principal :

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Date d'approbation initiale du projet : 29 mai 2017

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Maurice Lemelin

Président du CER de HEC Montréal

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SUMMARY

Creativity is a fashionable topic in research and in practice. The *creative type* is in demand, both as something to be and as something to acquire. Indeed, organizations want to hire creative people, and be innovative themselves. It is crucial in this hypercompetitive landscape. With the myriad of creative companies on its territory, Quebec is renown as an international paragon of creativity. Montreal has a lot of diversity, and its bilingualism is often cited as a key factor explaining the blossoming of creativity. However, bilingualism in Quebec has a conflicted history. English was long perceived as the language of business and of social mobility. It was the aspirational language of prestige and money. Bilingualism is still predominantly unidirectional, meaning it is the French Canadians who transition to English, and rarely the reverse. Even in Montreal based organizations, if a single person does not understand French in a meeting it is likely that everyone will transition to English (regardless of their level of fluency) even if the majority of the other persons present are francophones.

This thesis aimed at determining the impacts of working in a secondary language on creativity. What are the consequences when people force themselves or are forced to verbalize their ideas in a secondary language? An experimental approach was selected; a protocol was designed, comprising two surveys and a creative ideation task; and 30 participants were recruited.

The results showed that working in English had a strong negative impact on fluency. This means that while working in a secondary language, people generated fewer ideas, which is a negative indicator for creativity. The results also showed trends indicating that working in English made participants less expansive and more fixated, leading them toward producing ideas that were more ubiquitous.

Leading and managing for creativity is challenging and often managers seem to be better at saying they want creative people than at actually managing and motivating them once they have them. There is a need to discuss better practices to optimize creativity and innovation and leverage people's unique expertise and skills, including language, by establishing norms that are less about conformity.

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SOMMAIRE

La créativité est un sujet à la mode tant en recherche qu'en pratique. *Être* créatif est tendance et c'est aussi en demande auprès des entreprises qui veulent recruter le *type* créatif pour devenir plus innovantes. C'est une habileté cruciale sur le marché contemporain hypercompétitif. Dû au foisonnement d'entreprises créatives sur son territoire, le Québec est maintenant un parangon de créativité reconnu sur la scène mondiale. Montréal possède beaucoup de diversité et son bilinguisme est souvent cité comme facteur contribuant à la richesse créative et à sa concentration. Par contre, l'histoire du bilinguisme au Québec est complexe. L'anglais y a longtemps été la langue des affaires et de la mobilité sociale; la langue de l'argent et du prestige. Le bilinguisme est toujours très unidirectionnel. C'est-à-dire que ce sont principalement les Canadiens-Français qui adoptent l'anglais et rarement l'inverse. Même au sein des organisations basées à Montréal, si une seule personne présente dans une réunion ne comprend pas le français, il est fort probable que tous vont adopter l'anglais (peu importe leur niveau de maîtrise) même si les autres participants sont majoritairement francophones.

Ce mémoire avait pour but de déterminer les impacts du fait de travailler dans une langue seconde sur la créativité. Quelles sont les conséquences lorsqu'une personne se force ou est forcée de verbaliser ses idées en anglais? Une approche expérimentale a été choisie; un protocole créé; et 30 participants recrutés.

Les résultats démontrent que travailler dans une langue seconde a eu un impact fortement négatif sur le nombre d'idées générées (*fluency*). Il s'agit d'un indicateur négatif pour la créativité. Les résultats illustrent aussi des tendances indiquant une perte d'expansion et plus de fixation, ce qui signifie que les participants produisaient des idées plus communes.

Gérer la créativité et être un leader qui sait la motiver n'est pas chose facile. Souvent, les gestionnaires semblent être meilleurs à dire qu'ils veulent des gens créatifs qu'à réellement les gérer et les motiver. Le besoin d'une discussion sur le sujet est criant afin d'optimiser la créativité et mieux mettre à profit l'expertise et talent des gens en établissant des normes qui sont moins axées sur la conformité.

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The limits of my language mean the limits of my world.

(Ludwig Wittgenstein)

1. INCIPIIT

Whether I look at my own professional experiences and those of my peers and friends in Montreal, the conclusion is the same: our experiences are bilingual. What I mean by bilingual professional experiences is that even in organizations that are based in Montreal, that are officially francophone, and that are populated with native French-speaking employees, a considerable amount of work and social interactions happen in English.

To explicate this phenomenon, I will introduce an exemplar from my own experience. I was recently working as an analyst within an in-house consulting department in an international Montreal-based engineering firm. Our team of five in Montreal (two analysts, two senior consultants/managers, and a vice-president) were all native francophones, and so were most of the colleagues we interacted with through our work with the other departments of the firm. However, most of the clients of this engineering firm were international. As a result, a large part of the work product was executed in English. This insidious presence of English in the work product seemed to overflow into our work-related discussions, and thenceforward into our social interactions, as these were frequently intertwined. It resulted in a group predominantly constituted of francophones communicating principally in English. How could this be explained? And what are the potential impacts of this phenomenon?

From my experiences, and from numerous conversations with friends and colleagues over the years, it is not a rare occurrence, it is not an exception. A friend recently told me, while we were discussing my current research, that a recent work meeting unfolded entirely in English for one person from the Toronto

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office was in town; eleven francophones and one anglophone and, instead of translating in English for the one person, everyone adopted the language of Shakespeare, even those who were uncomfortable doing so. Interesting... And puzzling.

This thesis is not about language policies or about a *bonjour-hi* debate, but the phenomenon is nonetheless fascinating considering the myriad of instances I have lived and heard about similar stories (in the dozens). Notwithstanding the politics of it, what does it mean for people to force themselves, or sometimes be forced, to work and interact in a secondary language when they theoretically do not have to? They are not in the minority. They could dictate the opposite course of action in most cases. They could stand their francophone ground... and win. Are they instantly put in a losing position? And what about the organizations? This is the central point of interest for me: whether or not there is a loss provoked by having to express oneself primarily in a secondary language because of the environment.

In the ensuing sections I will provide a sociolinguistic portrait of Quebec and Montreal, explore the perception of Montreal¹ as an important global creative hub, and how bilingualism is cited as a key factor to explicate this creativity. However, as much as bilingualism is highlighted in discourses describing Quebecois.es as creative, an insufficient number of studies exist regarding the impacts of working in a secondary language. Resulting from this gap, I became fascinated by the meaning of working in a secondary language and developed a desire to observe if it could make it harder to get the most out of people and therefore contribute to organizations losing out on creative and innovative work product. Hence, I focused this study on investigating what are the potential impacts of working in a secondary language on creative ideation. I chose an epistemological position that was as objective as possible through the adoption of a primarily quantitative positivist posture, and the use of an experimental

¹ When discussing Montreal/Quebec as a creative hub, I will use the terms interchangeably as references use both. There are creative organizations that are internationally renowned and outside of Montreal per se.

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approach. The goal was to fill what I perceived as an opening in the literature and to position this research project in the fields of creativity, brainstorming and idea generation, and linguistics/bilingualism. The standpoint I adopted was not a manifesto on language relations in Quebec, even though the first section of this thesis will explore exactly that to provide context. The use of bilingualism in Quebec as a case study without providing a politicohistorical perspective would be unsagacious considering just how unique the linguistic situation in Quebec is.

1.1 QUEBEC'S SOCIOLINGUISTIC PORTRAIT² – AN AMBIVALENT RELATIONSHIP

The evolution and preservation of French in Quebec is a complex story spanning many centuries. In Quebec, issues of language are cultural, historical, political, and economical. To this day, they are a sensitive topic with many sore points and tensions between pride and insecurity; pride because the Quebecois identity is deeply rooted in its francophone status, and insecurity (and irritation) as a reflection of the historical relations with France, and English Canada.

1.1.1 HISTORICAL LINGUISTIC TENSIONS

When looking at Quebec's history over the past 70 years, it is impossible to ignore the question of language in public discourses. Indeed, Quebec is a bastion of French in a vast anglophone landscape. At several moments throughout its more than 400 years of existence³, Quebec's French identity was in jeopardy. Indeed, when Britain took over the governance of the Province of Quebec with the Treaty of Paris in 1763, assimilating those *poor uneducated French Canadians* was a given. Henceforward, there has been tensions and somewhat of an obsession with language in Quebec. This fixation is well documented by Chantal Bouchard (2009) in her cleverly titled book *Obsessed with language*. In addition to obsessiveness, there is great deal of self-consciousness. Yes,

² I heavily based this section on a series of sociolinguistic and literature seminars I took at McGill University (undergraduate level and master's level). Catherine Leclerc: *Littérature québécoise contemporaine* (Fall 2013); Chantal Bouchard: *Histoire de la langue française* (Fall, 2013); *Les écrivains québécois et la langue* (Fall, 2015).

³ The *Province of Quebec* was officially founded with the Royal Proclamation of 1763. However, it was named *Quebec* by Samuel de Champlain in 1608, referring to Quebec City and the immediate surroundings, which was at the time the administrative seat for *Nouvelle-France*. *Nouvelle-France* was populated with francophone settlers, which is why I characterized Quebec's French identity as being over 400 years old.

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francophones are a strong majority in Quebec, but within Canada and the North American continent, they are a minority. This minority mentality contributed to a need for self-protection. And let's not forget that for the longest time before the Quiet Revolution, French Canadians were an economically and socially disadvantaged majority relative to the elite anglophone minority; a privilege minority who was decidedly insensitive to the francophone majority and its desire to better its situation (Rudin, 1985; Montreuil, Bourhis & Vanbeselaere, 2004; Bouchard, 2012). As a result, the resentment toward English was deep rooted, and in many ways justified.

English has long been the language of business and management. The business owners and the upper class were anglophone, with the exception of a small French-Canadian elite. The cheap labor was largely composed of French Canadians who had to leave a more autarkic rural lifestyle (Bouchard, 2012). English was the language of power even though the territory was recognized as francophone. An important consequence was strong linguistic insecurity: the feeling some people have that they cannot speak well or are unable to use their language in prestigious ways (Labov, 1963, 1966. As cited in Bouchard, 2009). Linguistic insecurity can lead to people changing how they sound, for instance by adopting an unnatural yet more prestigious form of a given language (Labov, 1963), or by hypercorrecting (Baron, 1976). These phenomena are still visible today.

Classically, the ruling class has dictated what is *proper*; the *proper* way to talk; the *proper* way to behave; the *proper* things to value. Linguistic insecurity comes from a desire to emulate that aspirational class and to develop a sense of belonging by learning and adopting their codes and mores. Looking back at France before the 1789 Revolution, the reference was the noble class and *la langue du roi* [the king's language]. Consequently, rich and powerful merchants forming the bourgeoisie, who unlike the nobility were working (capital offense at the time), would hypercorrect to sometimes comical effects to emulate the *bon*

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*usage*⁴ [proper usage]. Following the French Revolution, the bourgeoisie became the ruling class and their pronunciation and sound became what was proper. Interestingly, this change in sound following the Revolution, is a significant factor explaining why the French in France and the French in Quebec are phonologically so different. Indeed, by 1789, the Province of Quebec was governed by Britain and disconnected from what was happening in France. Therefore, the local French was not impacted by that new way of speaking instigated by the bourgeoisie overhaul and the norm remained *la langue du roi*⁵. In hindsight, it is interesting to realize that, while often criticized as inferior to the normative French of Paris even to this day, the Quebec French is simply based on a different standard, a pre-French Revolution *bon usage* based on *la langue du roi* and *le siècle des Lumières* [Age of Enlightenment] instead of on the subsequent standard established by the new ruling class (Bouchard, 2012). Parisian French has arguably changed considerably more over the years than the one spoken in Quebec (*L'Académie Française* being the culprit). It is because of this disconnect that when people came to Quebec from France some 60 years following their loss of control over the territory they found the local way of speaking odd, quaint, and well, *wrong*. The conflict is far from new. This notion of *correct variety* strongly contributed to the growth of language insecurity (Labov, 1966). Stereotyping of dialects and the educational emphasis of a certain *correct form* are also contributing factors (Baron, 1976). For instance, in the Montreal of the 1950s and 60s, *joual*⁶ was strongly associated with the French-Canadian lower working class. These people were uneducated, and their vernacular was both easily identifiable and typecasted. Educated francophones were taught a more neutral sound mirroring France⁷.

⁴ As defined by Vaugelas in 1647 (As cited in Bouchard, 2012) as « [L]a façon de parler de la plus saine partie de la Cour, conformément à la façon d'écrire [sic] de la plus saine partie des Auteurs [sic] du temps », which would roughly translate to "The way it is spoken by the highest segment of the [Royal] court, in conformity to the way it is written by the most prestigious authors of the time".

⁵ The language in Quebec also developed neologisms to represent local realities (e.g. *poudrée* for a snow storm). It also borrowed words from Amerindians (e.g. *bleuets* [blueberries], *atoka* [cranberries]).

⁶ *Joual*, as named by the journalist André Laurendeau was phonetically recognizable and lexicographically as well through the integration of English words, which usage were often faulty (Derived from Le Petit Robert).

⁷ There were radio programs with the sole purpose of helping people correct their language.

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French Canadians are an interesting and rare example of linguistic insecurity as two forms intersect. As recently as the 1970s, surveys showed that there was an insecurity vis-à-vis their own language (they felt they spoke a lower form of French compare to France) (D'Anglejan & Tucker, 1973), but also felt that the language of power and money was English. English was perceived as prestigious. As secularism took over, French became the core of the Quebecois identity but, simultaneously, French Canadians were insecure about their language and acutely aware that English was the language of upward mobility (Bourhis, 1984). English was, and remains, the *lingua franca* of North America.

In addition to being criticized for speaking the *wrong* French, Quebecois.es were disparaged by anglophones for speaking French at all. *Speak White* was an insult used by English Canadians toward people speaking other languages than English in the public spaces. They would tell French Canadians to *Speak White*. In 1968, Michèle Lalonde turned the slur into a poem to express the reality of French Canadiens and their collective discontent. The following is an excerpt from *Speak White*:

nous sommes un peuple inculte et bègue
mais ne sommes pas sourds au génie d'une langue
parlez avec l'accent de Milton et Byron et Shelley et Keats
speak white
et pardonnez-nous de n'avoir pour réponse
que les chants rauques de nos ancêtres
et le chagrin de Nelligan⁸

During that period, a significant body of literary work surfaced with the oppression of French Canadians as a main theme (e.g. Gaston Miron). It was finally time not to *Speak White*, but to *speak up* as I will highlight in the following section when describing the political measures taken to provide status to French.

To this day, Quebec media publish stories that are less than flattering about language-use in Quebec (Bouchard, 2009). Pierre-Elliot Trudeau famously referred to Quebec French as the *lousy French*, which was callous considering he

⁸ We are a rude and stammering people / speak with the accent of Milton and Byron and Shelley and Keats / speak white / and please excuse us if in return / we've only our rough ancestral songs / and the chagrin of Nelligan (Translation in Mezei, 1998).

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might have mastered a more neutral sound but was oftentimes erroneous in word choices and forms⁹ (Belleau, 1974). This self-flagellation is noteworthy as it is nearly impossible to see other cultures demean themselves in such ways. The use of English words is considerably more pervasive in France than in Quebec, yet they do not seem to talk about the decline and bastardization of their language (Bouchard, 2013). Justified or not, linguistic insecurity persists. As Bouchard (2009) pointed out, the fact that in Quebec you are noticed for having a more standard or neutral sounding French is problematic in itself. There is still a prestige associated with a certain phonetics, and with speaking English. It is palpable in the metadiscourses, a sort of *surconscience linguistique* [linguistic overconscience].

1.1.2 [LINGUISTIC LEGISLATIONS AND POLICIES](#)

“A language is worth what those who speak it are worth, so too, at the level of interactions between individuals, speech always owes a major part of its value to the value of the person who utters it. (Bourdieu, 1977, p. 652)

A critical point was reached in the 1950s and 60s when the future of Quebec as a francophone nation was in peril. Back in the 1960s, walking on Ste-Catherine Street, one could see signage that was nearly exclusively in English. This overdominance of English in signage was pervasive and some objects were only known by their English noun; the French word for a light switch [*interrupteur*] was ignored by many as it was not seen or heard (Bouchard, 2013).

With the Quiet Revolution, it was time for legislations to reverse the course and avoid becoming anglophone in the ensuing 20 or so years (Bouchard, 2013). In 1977, the Quebec’s Language Charter was born (the famous and infamous Law 101), and it was all encompassing in establishing French as *the* official language: language of administration, of the workplace and of business, of public schooling, and of signs (Corbeil, 2013). Unilingual signage in French was the new norm. It was a way of regaining the upper hand in the power relations

⁹ This would be an exemple of hypercorrection; the façade was improved, but the substance was deficient.

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on the territory. It was not subtle, and it was not a secret, the linguistic landscape with unilingual signage and the *frenchified* toponymy (e.g. Streets were renamed) were symbols of the competition and struggle between languages (Lamarre, 2014). It was a semiotics of defiance toward English, René Lévesque wrote:

“It is important that the face of Québec be French foremost, if only to not revive in the eyes of immigrants the ambiguity of the past as to the character of our society... Every bilingual sign says to immigrants: ‘There are two languages here, English and French, and you are free to choose’. It says to Anglophones: ‘No need to learn French, everything is translated’. This is not the message we want to send. It is vital that all be aware of the French character of our society.” (Bernard, 2008, p.366. As cited in Lamarre, 2014, *her translation*)

The law evolved and now allows for bilingual signing as long as the French remains dominant. Nonetheless, it created a forceful cultural field, where language signage was used as a powerful symbol of French-Canadian agency (Bourdieu, 1993). The Quiet Revolution with its linguistic legislations and increased state intervention in the economic, social, and educational domains finally allowed for the emancipation of French-speaking Quebecois.es.

The deliberated and sustained language planning in Quebec has yielded one of the few success stories of *Reversing Language Shift* (Fishman, 1991; Bourhis, 2001). Reversing the course of a language losing its status as primary vehicular language is rare. Without this careful language planning it is highly probable that Quebec would have become just another English-speaking territory in North America. Failing to preserve French would have obliterated an identity that is rooted in this language (Fishman, 1991).

Resulting from the major legislations regulating the language of the public and commercial signage over the last few decades, Montreal looks more francophone today than even 30 years ago, and the French language itself is de-anglicized (Bouchard, 2013). These legislations were substantial projects during the Quiet Revolution to improve the status of French and French-speakers. They were instrumental in consolidating the *French fact* of Quebec, and in protecting

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the survival of a distinctively French society in North America (Bourhis, 1994; Bourhis, 2001). However, listening to people speaking on the street today, it is also more bilingual than ever (Lamarre, 2014). Bilingual dynamics in Quebec is what I will explore in the ensuing section.

1.1.3 BILINGUAL PRACTICES IN QUEBEC AND CURRENT DISCOURSES

These days, there is less linguistic insecurity and more freedom to play with bilingualism. Even back in high school with friends, it was *cool* to speak in English. But sporadically, there are reminders that there is still protectiveness felt toward French as clearly illustrated by the recent *bonjour-hi* debate. It might seem silly to some people, especially younger generations who have not lived through the precarious years or read much about them, but let's remember that some 50 years ago Quebec was at a crossroad (Bouchard, 2014). Language in Quebec as long been a *battlefield* and it is now more of a *playing field*, but the game is serious, and something is at stake (Lamarre, 2014).

Factually, French Canadians have shouldered most of the burden of bilingualism, which makes bilingual communication a very unidirectional affair (Lamarre, 2014). French Canadians are notably more bilingual than English Canadians. The tendency is to shift to English as soon as there is a single anglophone individual. Indeed, research showed that it is Montreal's anglophone bilinguals who were less tolerant of not being served in their first language, while francophones, bilingual or not, were more understanding and accommodating (Bourhis & Lopicq, 1993). French Canadians in Montreal tend to behave as minority group speakers and Anglo Canadians in Montreal tend to behave as majority group speakers, while the reality should be the opposite (Landry, Allard & Bourhis, 1997; Bourhis, 2001).

English remains perceived as the language of prestige for business transactions (Bourhis & Lopicq, 1993). The diglossic situation in favor of English might not be as ominous as it used to be, but in business settings there is still more power conferred to English; French is second rated. While there is less of a feeling of French being imperilled, insecurity persists, and a certain status is

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bequeathed to English from a North American cultural perspective. Paired with the accommodating nature of French-speaking Quebecois.es, it contributes to the pattern of swiftly migrating to English whether it is consciously desired or not. In the subsequent section, I will present an overview of why Quebec is respected as a creativity centre and how bilingualism is often heralded as a key factor.

1.2 GROWING RECOGNITION OF QUEBEC AS A GLOBAL CREATIVITY HUB

Observing the Quebec Inc. over the last two decades, it is easy to find innovative organizations. Organizations such as Cirque du Soleil, Sid Lee, Moment Factory, and Cossette easily come to mind as pioneers of creative companies. Thanks to these organizations and others that have burgeoned since and that are acting as ambassadors for our talent, Montreal is already an established and recognized creativity hub on the international scene; *Montreal* is a trendy and dynamic brand (“Montréal: une créativité hors du commun et en demande”, 2017; Gosselin, Baier, Muller, Zenker & Cohendet, 2010; Stolarick & Florida, 2006).

It is obvious when looking at organizations and start-ups that creativity and innovation are flourishing everywhere. In fact, in 2018 Quebec sent its biggest delegation to date to the South by Southwest (SXSW) Conference & Festivals in Houston, Texas (“South by Southwest 2018: Une vitrine exceptionnelle [...], 2018). SXSW focuses on music and films, but also on emerging technologies (mainly interactive technologies); more than 400,000 persons from over 95 countries attended in 2017. This year, Quebec sent more than 120 persons, including 24 artists, but also 65 organizations’ representatives working in artificial intelligence, virtual and augmented reality, financial technologies, numeric creativity, etc. A few of the organizations present were: C2 Montréal, Banque Nationale, Genius Marketing, LG2, and Oatbox. During the conference, over 2,000 electronic bracelets from Connect&Go were distributed, highlighting an innovative data sharing technology from Quebec (“La créativité et le savoir-faire technologique du Québec à l’avant-plan à South by Southwest 2018”, 2018). Other examples acknowledging Quebec’s great creativity are plentiful:

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- Montreal was named a UNESCO City of Design in 2006 for its creative potential (“Creativity thrives everywhere in Greater Montréal”, 2014).
- C2-Montréal is an indispensable stop on the calendar of creative people.
- In 2013, the magazine Fast Company named 10 Quebec organizations on their list of most creative and innovative companies (“Dix entreprises québécoises parmi les plus créatives”, 2013).
- Creative industries are directly employing over 91,000 persons (4.6% of the total jobs in the Montreal region) and generate 8.6 billion dollars in direct and indirect economic benefits (“Montréal: une créativité hors du commun et en demande”, 2017).
- During the 2018 Interactive Innovation Awards at SXWS, Moment Factory, for its Jacques-Cartier Bridge Interactive Illumination Concept, won an award “Honoring innovations in eco-friendly or sustainable energy, transportation, and IoT technology, making life in the connected world a smarter, cleaner, greener, and more efficient Internet of Everything” (“Announcing the 2018 Winners of the Interactive Innovation Awards”, 2018). Were also honored CieAR and wrnch as part of the five most innovative augmented reality companies (“La créativité et le savoir-faire technologique du Québec à l’avant-plan à South by Southwest 2018”, 2018).

These are just a few of the numerous examples available, but they are enough to showcase an impressive portrait of the creative power found in Quebec. According to Investissement Québec (2018), creativity and innovation is in Quebecois’ DNA. To support this bold statement, they provided the following figures: 31% of the industrial research and development jobs in Canada are in Quebec, and 29% of Canadian expenditures in the same sector are also in Québec (“Pourquoi le Québec? Innovations et succès commerciaux”, 2018). In addition, among the 25 most populous metropolitan areas in the United-States and in Canada, Montreal is ranked second for the percentage of its workforce working in the *super-creative core*¹⁰ (Florida, 2002, page 328. As cited in Stolarick & Florida, 2006). Montréal International (2014) described one of the aces in Montreal’s sleeve making its creative potential so strong as follow:

“Montréal’s creative potential lies in the people who make up its rich multicultural fabric. Greater Montréal is home to two million workers, 50% of whom are bilingual and a fifth trilingual. In all, more than 100 languages are spoken in Montréal, a place where diversity can truly be said to inspire creativity.”

¹⁰ Following fields: computers, mathematics, architecture, engineering, life sciences, physical sciences, social sciences, education, training, library, arts, design entertainment, and media.

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“Montreal offers a unique setting in which to investigate the innovative impact both of language and cultural connections” (Stolarick & Florida, 2006, p. 1802). This bilingualism is quite a unique factor on this continent, and it is paired with a proximity with other major cities where creativity is abundant. This rare combination creates the opportunity for Montreal to become a centre for diversity to congregate and to foster creative clusters (Stolarick, Florida & Musante, 2005; Gosselin, Baier, Muller, Zenker & Cohendet, 2010; Darchen & Tremblay, 2015). In a study from Stolarick & Florida (2006), managers mentioned seeking out multilingual people to tackle difficult problems as “they understand the world from different perspective and are more likely to devise creative and innovative solutions” (p.1812).

1.3 SPEAKING THE LANGUAGE OF CREATIVITY: AN OVERVIEW OF THE PRESENT STUDY

How does everything mentioned above relates to a thesis in strategy and management focused on creativity and innovation? Well, French-speaking Quebecois.es are often readily volunteering or put into situations where they must produce work and ideas in their secondary language, English, and few if any seemed to have considered the potential consequences of this phenomenon.

Quebec is a recognized creativity hub and bilingualism is often listed as one of the key features explaining this innovativeness as mentioned hereinabove. Nevertheless, in addition to being bilingual, due to linguistic insecurity and to the prestigious status bestowed upon English in business, Quebecois.es are swift to give up on their first language to accommodate.

Before going further, I want to clarify that I am in no way negating that working or communicating in a secondary language can be a choice. However, I have perceived over the years that oftentimes this notion of choice is ambiguous. The question seems to rarely be *do I want to?* but rather *do I feel I have to and/or that it would be better?* The distinction is slight but profound. I believe that more often than not the choice between these two options is not dichotomic and includes a fair amount of both. For instance, I decided to write this thesis in

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English because I wanted to *and* because I felt I had to in order to reach a larger audience in academia. I also felt that it would be valuable practice for a future career in academia where the leading journals and doctoral programs are, for better or worse, in English.

Returning to the core of this thesis, numerous studies I consulted supported the positive relationship between creativity and the bilingual mind (e.g. Hommel, Colzato, Fischer & Christoffels, 2011; Jacob & Pierce, 1966; Kharkhurin, 2015; Kharkhurin & Samadpour Motalleebi, 2008; Lee & Kim, 2011; Leikin, 2013). One important caveat remains though, few seemed to have looked beyond the cognitive aspects to encompass the practical side of actually having to work in a secondary language. Research showed that monolinguals have an edge regarding verbal creative behaviour¹¹ (e.g. Kharkhurin, 2010), but there is a need for more in-depth studies comparing bilinguals' creativity in their L1¹² vs. in their L2. Being monolingual is not an possibility in Quebec.

French Canadians are accommodating by nature *vis-à-vis* language and they are bearing most of the bilingual work. They are the ones actually working in their L2. What might be the impacts of this on their ability to verbally express their creativity? Their bilingual or multilingual minds may make their cognitions more creative, but how well are they able to articulate these when not given the opportunity to do so in their L1? This reflection led me to the purpose of this thesis: to study the impacts of working in a secondary language on creative idea generation. In the ensuing sections, I will explore literatures and theories that will contribute to the theorization of the issue, introduce the experimental protocol I designed and used to collect data, present the results, and conclude with a discussion on future research and implications for organizations and managers.

¹¹ Research showed that being monolingual is significantly better regarding the quality and richness of a language. There seems to be a loss happening in the first language to make space for the secondary language. In the end, both languages of the bilingual person appeared to be poorer than the sole language mastered by the monolingual.

¹² First language, mother tongue, and L1 all refer to French, while secondary language and L2 refer to English.

2 CONCEPTUAL FOUNDATIONS

While exploring the scientific literature seeking to understand what it means to work in a secondary language, I found a field that was noticeably understudied. An appreciable amount of research has been conducted on bilingual and multilingual cognitions, but the experimental settings adopted made participants speak primarily in their mother tongue. There were a few articles regarding education in a secondary language, and these will be an essential part of the discussion. The present conceptual foundations section is an overview of the scientific work on creativity, idea generation, and linguistic/bilingualism aiming to provide a framework for this thesis that will, I hope, expand a fairly underdeveloped field of research that is imperative for Quebec's future.

2.1 CREATIVITY AND THE CREATIVE INDIVIDUAL

Creativity is a fashionable concept of late. In research and in practice, it appears everywhere and in relation to everything. Scholars are researching it (e.g. Jia, Shaw, Tsui & Park, 2014 ; Sarooghi, Libaers & Burkemper, 2015; Sonenshein, 2016; Hewison & Holden, 2016), and CEOs single it out as a key skill (“Mark Cuban says this skill will be critical in 10 years, and Elon Musk agrees”, 2018; “Creative careers may be the most future-proofed, says one of Bill Gates' favorite authors”, 2018). Everyone wants to be creative. It is the *cool* thing to be and to do. But what does it truly mean to be creative? In essence, creativity “is a cognitive skill that is highly desirable in a variety of situations and settings and can develop in different forms” (Agogu , Le Masson, Dalmasso, Houd  & Cassoti, 2015, p. 313). Creativity is often envisioned in reference to artistic skills (e.g. famous painters, musicians, etc.), but it is broader than any domain-specific conceptualization (Torrance, 1967; Wallach & Kogan, 1965; Young, 1985; Plucker, 1999; Plucker & Beghetto, 2004). Creativity is a habit and a process, but a complex one that is yet to be fully understood (Abraham & Windmann, 2007; Steinberg, 2006, 2012; Tharp, 2008). Sternberg (2012) referred to creativity as:

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“[...] a way of life that one regularly utilizes so that one is hardly aware one is engaging in it. If we are to assess creativity, we need to assess it as a habit of ordinary life, not merely as something one can do at extraordinary times if challenged on a standardized test” (p. 3)

Creativity is about revitalizing and finding new, fresh, and valuable ways to accomplish routine processes and respond to problems (Young, 1985; Sternberg, Kaufman, & Pretz, 2002. As cited in Sternberg, 2012; Sternberg & Grigorenko, 2004); it is about transmuting what *is* into something better; it is about moving away from the traditional toward the unusual. Perceiving creativity as a process is sensible as it is doubtful that Picasso and Braque created cubism solely by arising one morning and proclaiming “today we will break the codes and create a new artistic movement!”. By considering creativity as a process, it makes its applicability more inclusive and a key process in countless fields from science to arts (Weisberg, 2006).

Framing creativity as a process also highlights that it requires work and discipline to reach that *Eureka!* moment. Creativity happens at the intersection of a person’s creativity-relevant skills, domain-relevant skills,

and motivation (Amabile, 1996. As cited in Kurtzberg & Amabile, 2001). Some ground-breaking discoveries were accidents, fleeting moments of the universe providing a gift. Nevertheless skills are more generally implicated in the creative process and the creative individual is able to recreate the circumstances where all the stars seem to be aligned allowing the magic to happen (Young, 1985); otherwise, it is simply a monkey taking a chance with a typewriter.

There are different types and levels of creativity. Developing an innovative office filing system is certainly not on par with Einstein’s development of the theory of relativity. Indeed, Kaufman and Beghetto (2009) classified creativity into four levels. The first level is the Big-C, which is populated by the

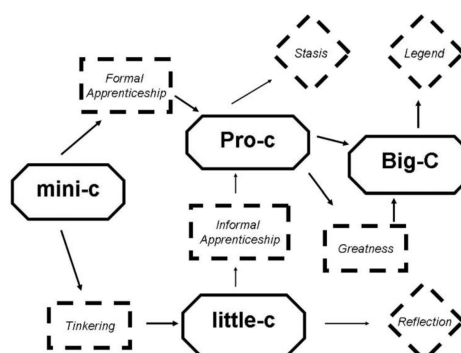


Figure 1: The Complete Four-C Model (Kaufman & Beghetto, 2009)

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unmistakeable creative geniuses with eminent contributions. This is the level where Mozart (e.g. The Marriage of Figaro opera, Rondo Alla Turca, etc.), Einstein (e.g. The theory of relativity), Darwin (e.g. Theory of evolution), and so forth would be classified. It is the level of legendary innovations. The second level, the little-c, is more about everyday activities for which people do not have to be experts to participate in. The third level, the mini-c, relates to the creativity that is part of the learning process: how people learn and how they interpret and process. Finally, the fourth level, the pro-c, is the intermediate stage people reach before the big-C. Legends are often recognized as such only *ex post facto law*. Nevertheless, during extensive portions of their life, they were experts with highly innovative work that placed them above the little-c. For instance, a respected scientist with a compelling body of work, but yet to win a Nobel.

Creativity is more than throwing ideas in the wind. As I mentioned above, the notion of novel ideas being valuable matters. It is about executing these ingenious ideas and coming up with a result, a work product that is purposeful. Specifically, it must be “accepted as tenable or useful by a group of people at some point in time” (Stein, 1953, p. 311). If a creative idea is not useful, has no apparent value, or is not a practical innovation on something, how can it be branded as creative since there is no reference point or metric of assessment? Making something that is new requires a cognizance of what has been done before. The famed abstract painter Piet Mondrian reflected (in Sedgwick, 1966. As cited in Young, 1985):

“What is wrong with the abstract painting of the younger artists today is that they feel their painting began where mine leaved off, without going through what mine has gone through to be the way it is.” (p. 85)

Mondrian had an insightful reflection on the need for creators to be aware of their forebearers to have depth and perspective, and to avoid purely reinventing the wheel.

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To be creative, one needs the ability to see beyond the obvious and habitual. At the heart of the cognitive approach to creativity is how the information processing operations influence the very ability to be creative (Abraham & Windmann, 2007). Indeed, a person's network of knowledge is designed in a way comparable to a social network. There are close friends (strong ties) who are easy to recall and to get in touch with, but there are also farther acquaintances (weak ties) who might not be thought about automatically and who might necessitate considerable work to contact and even remember (Nelson, 1989). The concept of semantic networks (the words we have to describe what we know) is similar; a given concept will activate nodes (pocket of knowledge in the networks) that are the strongest and closest to it in the network. For instance, the concept *table* will likely elicit the answer *chair* substantially earlier than the answer *multiplication* (Mednick, 1962). However, semantic networks vary greatly from one individual to another. A mathematics professor may have a closer level of associative strength between the concepts *table* and *multiplication* than most people. This also shows how domain-specific knowledge and expertise can lead to cognitive biases as people spend considerable time immersed in their professions (Wiley, 1998; Purcell & Gero, 1996). I will discuss this notion further subsequently.

Having previously defined creativity as a process that is more than an ephemeral stroke of genius, it is important to wonder if there are specific human characteristics that could explain why some people are more creative than others. Undeniably, people have unique personalities with distinct traits and some of these traits are reportedly more closely linked to creativity. Personality traits are hard core variables that are biologically rooted and mostly stable, and they influence how people are and their self-conception of who they are (Asendorpf & Aken, 2003; DeYoung, 2010; Karwowski, Lebeda, Wisniewska & Gralewski 2013). From these relatively stable personality traits derive patterns of behavior, emotion, cognitions, etc. (Wilt & Revelle, 2009. As Cited in DeYoung, 2010; Zillig, Hemenover & Dienstbier, 2002). Using the Big Five personality traits model (Johns & Saks, 2010; see appendix 1), the traits that seem to impact

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creativity the most as per the literature are openness to experience (positive) and neuroticism (negative) (Karwowski, Lebuda, Wisniewska & Gralewski 2013). There also appear to be a positive but weaker relation with conscientiousness and extraversion, and a weak and negative relation with agreeableness¹³.

In summary, creativity is the process of going beyond the routine to find new and original ways to accomplish tasks and solve problems. It is influenced by people's personalities, networks of knowledge, semantic networks, and the ability to retrieve information that is rare and novel. In the following section, I will introduce the natural tendency that is inhibiting creativity: the fixation effect.

2.1.1 [HINDRANCE TO CREATIVITY : THE FIXATION EFFECT](#)

While scholars described creativity as a habit and a process, it does not mean that it is easy to acquire or to achieve. Cognitive biases are there as a relentless reminder that humans do not have complete freedom and control over their cognitions. The main bias to be discussed in relation to creativity is *fixation*: “an obstacle, often self-imposed by the problem-solver, which blocks successful completion of a problem” (Jansson & Smith, 1991, p.4). In studies asking participants to design new objects with specific aims or functions, the participants often found themselves caged in existing or easily accessible schemas in their networks of knowledge¹⁴, and that even if they were not provided with a priming example (Agogu e, Poirel, Pineau, Houd e & Cassoti, 2014; Purcell & Gero, 1996; Jansson & Smith, 1991; Smith, Ward & Schumacher, 1993).

People become fixated on this spontaneously activated knowledge that is usually composed of existing and obvious ideas often based on cognitive routines. The force of it makes it hard to find divergent solutions to a given problem (Abraham & Windmann, 2007; Abraham, Windmann, Siefen, Daum, & G unt urk un, 2006; Agogu e et al., 2013). The first idea generated powerfully

¹³ Although an interesting framework to explore and understand creativity through personality traits, it is important to acknowledge that the relationships previously described are moderate in most studies and are not direct predictors of creative performance (Ackerman, Kanfer & Goff 1995; Karwowski, Lebuda, Wisniewska & Gralewski 2013; Marsh, Trautwein, L udtke, K oller & Baumert, 2006).

¹⁴ The gigantic spider web of all their knowledge organized in clusters/nodes of related concepts.

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influences what ensues. Frequently, what follows are concepts derivative from that very first idea and further exploration is constrained (Jansson & Smith, 1991; Purcell & Gero, 1996). The more people accumulate knowledge about the properties and uses of objects, the denser the networks of knowledge become¹⁵, and the more it will be activated when they try to generate novel alternatives. Accordingly, it will render more difficult their participation in creative ideation tasks aiming to measure their creativity and divergent thinking (Adamson, 1952; Agogu e et al., 2013). I will discuss such tasks subsequently.

Many scholars have furthered the understanding of the use of heuristics when trying to be creative. Vessey and Mumfort (2012) established four distinct moderators with noteworthy effects on the use and efficiency of heuristics: domain characteristics, expertise, ability, and motivation (particularly intrinsic motivation – Amabile, 1997). Being passionate about what one does expand curiosity and willingness to explore. Being intelligent, able, and having the right expertise will do little without ambition and grit to investigate and look beyond.

In summary, creativity is: a cognitive ability that can be domain-specific and/or wide-ranging; the rejuvenation of a product or process into something new; the amalgamation of some personality traits; a stroke of luck; varying in scale from legendary discoveries to smaller yet practical innovations; mysterious; multidimensional; etc. However, regardless of the specific lenses chosen to look at creativity, it is never deemed easy since humans tend to rely and fixate on what they know rather than dive in the unknown and untested.

2.1.2 MEASURING CREATIVITY

Creativity is a preeminent object of scientific inquiries. Nevertheless, it remains subjective, even ethereal (e.g. Boden, 2005). Its association with artists and visionaries who are simply born with this Big-C ability lingers. Nonetheless, scholars have developed ways to measure creativity. The most well-known and

¹⁵ There will be larger clusters of habitual knowledge containing more closely related concepts that, once activated, will activate other associated clusters. It will result in ideas that are highly congruent together. But, this high volume of tried-and-true routine knowledge will make it harder to explore concepts and clusters that are farther in the network and that could be valuable, novel, and bring original perspectives.

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used of these measures is the *Torrance Tests of Creative Thinking* (TTCT), developed in 1966 by the *father* of creativity, Dr. E. Paul Torrance. This test has since been translated into more than 35 languages and renormed four times, but its essence stays unchanged (1974. As cited in Plucker & Makel, 2010; Kaufman, Plucker & Baer, 2008; Kim, 2006; Torrance, 1972; Davis, 1997; Miller, 2002).

The foundation of these tests contributes to their extensive applicability: provide the participants with a straightforward task to accomplish and ask them to generate ideas (e.g. How to drop a hen’s egg from a height of 10 m without it breaking). The results are then evaluated based on four components (Torrance, 1972): Fluency (the number of relevant answers), flexibility (the number of conceptual categories produced), originality (that is “not secondary, derivative, or imitative” – Merriam-Webster), and elaboration (the amount of detail used to describe the ideas’ execution).

In more contemporary studies using this test and focusing on solving the problem of fixation, the factor of elaboration disappeared and was replaced by a new measure, *expansivity* (Agogu  et al., 2015). Expansivity is the number of answers belonging to conceptual categories outside the fixation effect¹⁶. Taking the example of the hen’s egg task, 81% of the answers will fall into the same three categories: damping the shock, protecting the egg, and slowing the fall (Ezzat, Agogu , Masson, Weil & Cassoti, 2018). Ideas outside these three categories are considered expansive and *defixated*. Table 1 presents a summary of the measures.

Table 1: Creativity measures

Measures	
Fluency	The number of ideas generated. <i>E.g. A participant generating 18 answers to a given task is more fluent than a participant generating 12 answers to the same task.</i>
Originality	Ideas that are novel and nonobvious (Corazza, 2016) <i>Based on a consensual coding (double-blind) approach where each answer is individually appraised based on a pre-established scoring scheme, either based on the intrinsic originality of the answers or on the originality of the categories to which the answers belong.</i>

¹⁶ While originality is purely qualitative, expansivity is a hybrid as it is both qualitative and quantitative; it is the *number* of very original ideas outside the fixation effect.

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Flexibility	The number of conceptual categories generated. <i>E.g. If participants are asked to find solutions to prevent a hen's egg from breaking when dropped from a height of 10 meters, answers that consist of protecting the egg (e.g. wrapping the egg in bubble wrap) belong to a different conceptual category than answers consisting of dampening the shock (e.g. put a mattress on the ground).</i>
Expansivity	The number of very original answers outside the fixation effect. <i>E.g. Answers and categories that are generated by less than 20% of the participants would be considered expansive and defixated. Based on the hen's egg task, answers that are outside these three categories: damping the shock, protecting the egg, and slowing the fall.</i>

The TTCT and such tests provide frameworks and metrics to evaluate ideas, but who is qualified to use these and to determine which ideas are creative? As I mentioned, creativity is more than domain-specific. However, when it comes to judging the product of creativity, it can only be reliably assessed by consensus, but by the consensus of experts or by people at least acquainted¹⁷ with the domain (Amabile & Mueller, 2011). It is vital when using Consensual Assessment Technique (CAT) since expertise allows to recognize if a particular idea is novel and contributing something new to a field. Amabile and Mueller (1982, 2011, p. 255-256) listed the following requirements to use CAT successfully:

1. Judges should all have had experience, roughly equivalent, with the domain;
2. Judges must make their assessment independently;
3. Judges should be instructed to rate the products relative to one another, rather than rating them against some absolute standards;
4. Each judge should view the products in a different order;
5. If this technique is to be used to evaluate performance on a task to which it has not been applied in the past, judges should be asked to rate the products on other dimensions in addition to creativity.

Once the individual assessments of the judges are gathered, it is critical to measure the validity of the results for this evaluation method is about agreement. Different approaches to calculate interjudge agreement exist (e.g. Stemler, 2004; LeBreton, James & Lindell, 2005; LeBreton & Senter, 2008).

In summary, creativity is a process to find novel approaches to problems and tasks. Protocols, such as the TTCT and the hen's egg task allow to test people through creative ideations activities. The product of these ideations is then judged

¹⁷ In early work, Amabile underlined the importance of having experts to perform assessment but since then, due to the impracticality of recruiting experts in most settings, her research adopted a more nuanced position of judges having to be familiar with what they are assessing rather than absolute experts.

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by qualified persons using CAT and established measures (fluency, originality, flexibility, and expansivity). In practice, generating ideas is inhibited by the fixation effect, which is the tendency to be imprisoned in familiar schemas. Especially in organizations, ideation occurs in specific settings, such as meetings and brainstorming sessions, which I will explore in the ensuing section.

2.2 IDEA GENERATION AND BRAINSTORMING: WHEN QUANTITY YIELDS QUALITY

Chance plays an important role in idea generation. Ever since Osborn (1953), the literature on brainstorming has put forward the notion that *quality emerges from quantity* (Diehl & Stroebe, 1987; Diehl & Stroebe, 1991; Rietzschel, Nijstad & Stroebe, 2006). Brainstorming is used to increase the production of concepts and “always we should keep asking our imagination: ‘What else?’ and ‘What else?’” (Olson, 1963, p. 130. As cited in Rietzschel, Nijstad & Strobe, 2007). The rationale behind the *quantity breeds quality* axiom is the luck of the draw; “each generated idea has an equal probability of being a good idea” (Rietzschel et al., 2007, p. 934; Diehl & Stroebe, 1987; Diehl & Stroebe, 1991; Rietzschel et al., 2006); and the emergence of novel and unconventional ideas will yield even more such ideas (Collaros & Anderson, 1969). But is there more to it than pure luck?

Finke, Ward, and Smith (1992) developed the creative cognition approach, which introduced the notion that, more than mere chance, originality is the product of specific cognitive processes on existing and accessible information in the networks of knowledge. While thinking, people generate ideas and these trigger other concepts in the brain. As a result, further ideas emerge. In the words of Nijstad and Stroebe (2006), “idea generation is a repeated Search for Ideas in the Associative Memory”, which proceeds in two stages: *knowledge activation* and *idea production* (SIAM model; p. 186). From SIAM, during brainstorming activity, already generated ideas function as cognitive search cues and activate knowledge stored in long-term memory, which is assumed to be organized as a network of semantically related knowledge (Nijstad & Stroebe, 2006; Nijstad, Stroebe & Lodewijckx, 2002; Rietzschel et al., 2007). Accordingly, it is comprehensive that, when brainstorming, people’s answers tend to emerge as a

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list of related concepts. They will generate ideas as clusters of associated thoughts until exhaustion. Afterwar, they will either move on to a different cluster, or simply stop producing ideas. If they continue ideating, it is then, with the more readily available clusters of ideas out of the way, that divergent ideas will emerge, if the motivation to keep searching is there. This is strongly related to the previous discussion on the fixation effect; it is hard to break away from the first idea and of the ones closely associated with it in order to start anew in an unrelated cluster.

What makes knowledge accessible in the first place? The accessibility of the information stored in our brain is enhanced by usage (Aarts & Dijksterhuis, 2000; Rietzschel et al., 2007). The more an expertise and the cluster of connected notions are used, the quicker they will be activated when having to find a solution to a given problem or situation. Habits are links between goals and actions that people undertake to achieve these goals, and people tend to choose the path of least resistance: the course of action that they already know will work and that is often not the innovative approach but rather the tried-and-true one (Rubin & Kontis, 1983; Bargh, 1989; Ward, 1994; Aarts & Dijksterhuis, 2000; Ward, Patterson, Sifonis, Dodd & Saunders, 2002; Ward, Patterson & Sifornis, 2004; Ward & Sifonis, 1997). Human imagination is more structured and derivative from habitual thinking than unbridled and wild. Truly creative ideas are rare.

As mentioned above, knowledge is stored in a network with different level of associative strength between the nodes/ clusters. Divergent thinking involves the generation of associations that are novel and that expands the network, and of responses to unstructured and multifaceted problems without clearly predefined solutions (Gibson, Folley & Park, 2009;

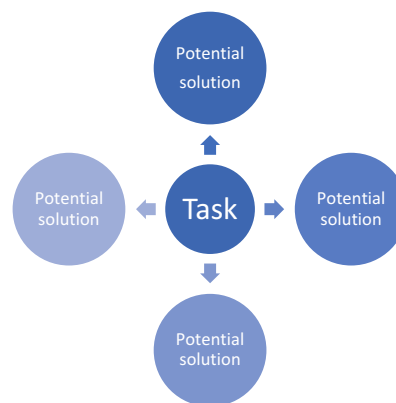


Figure 2: Divergent thinking process

Williams, 2004; Guilford, 1959; Mednick, 1962). Divergent thinking “has long

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been considered the cognitive key to creativity and continues to be a major consideration in creativity research” (Woodman, Sawyer & Griffin, 1993, p.298). When performing a creative task, divergent thinking impacts the variety of ideas generated and their originality (Basadur, 1994. As cited in Williams 2004). While many scholars today tend to closely equal divergent thinking and creativity (e.g. Silvia et al., 2008), others present it more as a state that is conducive to being creative as people think in divergent directions (e.g. Runco, 1991, Runco, 2008).

Divergent thinking is primarily assessed with tests similar to those used to evaluate creativity, during which participants are asked to generate, verbally or else, ideas to a given problem or task (e.g. TTCT, hen’s egg task) (e.g. Agogu e, Kazak ci, Weil & Cassotti, 2011; Agogu e et al., 2014; Silvia et al., 2008; Kim, 2006). The answers are then scored with Consensual Assessment Technique or similar approaches. Divergent ideas are those that fall outside the normative pool of common answers or categories used as a benchmark, which correlates with ideas that are outside the fixation effect as I described previously (Torrance, 2008. As cited in Silvia et al., 2008; Agogu e et al., 2014). Divergent thinking is a ping-pong game between phases of generation and exploration used to find non-normative solutions to problems (e.g. Abraham & Windmann, 2007; Finke, Ward & Smith, 1992; Groborz & Necka, 2003; Nelson, Wilson, Rosen & Yen, 2009).

The environment plays an important role in bolstering successful idea generation and brainstorming. To increase the probability of both quantity and quality, it is imperative to foster an environment where *brainstormers* do not feel their ideas are being constantly evaluated, especially since creative people tend to feel underappreciated and attacked for their ideas (Amabile, 1979; Sternberg & Lubart, 1995). Failing to create an environment that is perceived as neither controlling nor constraining will inhibit creativity (Amabile, 1996; Kurtzberg & Amabile, 2001). Accordingly, following a brainstorming activity, participants are often surveyed regarding their enjoyment of the task, their productivity, their impressions, etc. (Stroebe, Diehl & Abakoumkin, 1992).

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To recapitulate, knowledge is stored in networks believed to be organized semantically. Indeed, knowledge is often learned through its semantic, through the words describing the realities and concepts. Information that is often utilized is more easily accessible and swiftly retrievable. Clusters of knowledge closely associated with these frequently employed concepts will too be activated effortlessly and come to mind with ease; this is habitual thinking. However, the knowledge stored deeper in the network and not directly related to domains of information repeatedly used will take considerable effort and time to access. It is mainly in that difficult to reach territory that most divergent thinking occurs and original ideas reside. Brainstorming, when used in conducive circumstances, is a powerful method to boost creativity by encouraging people to move beyond the habitual thinking and by helping to overcome the fixation effect.

In the subsequent section, I will explore the language aspect of creativity. I will highlight how language is essential to communicate creative cognitions, and what bilingualism entails when people are trying to *speak their creativity*.

2.3 LINGUISTIC RELATIVITY AND SEMIOTICS: *THINKING FOR SPEAKING*

Linguistic is a broad field of research with several competing viewpoints. Some believe that language does affect cognitions in a deterministic way, while others are more skeptical/nuanced about the strength of the influence. It is a field, where numerous experiments have taken place over the years to support, refute, and further existing theories on how language impacts us. Research showed that children cardinal-number knowledge was robustly correlated with the amount of number talks parents engage in (Gunderson & Levine, 2011; Levine et al., 2010). Similar results were found regarding spatial talks and children's performances on spatial tasks (mental rotations, block designs, etc.) (Levine, Huttenlocher, Gunderson, Rowe & Pruden, 2009. As cited in Tversky, 2011). There are likewise compelling findings related to shape and material (Cook, Bassetti, Kasai, Sasaki & Takahashi, 2006). Another stream of inquiry illustrated the impact of gender pronoun differences on how objects were described. For instance, the word *bridge* is feminine in German and masculine in Spanish; when

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asked to describe a bridge in English, native German speakers used adjectives such as *beautiful*, *elegant*, *fragile*, *peaceful*, *pretty*, and *slender*, while native Spanish speakers used adjectives such as *big*, *dangerous*, *long*, *strong*, *sturdy*, and *towering* (Boroditsky, Schmidt & Phillips, 2003). From the same study, German speakers described a key (masculine in German) as *hard*, *heavy*, *jagged*, *metal*, *serrated*, and *useful*, while Spanish speakers described a key (feminine in Spanish) as *golden*, *intricate*, *little*, *lovely*, *shiny*, and *tiny*. There are numerous such examples (e.g. Athanasopoulos, 2009; Hoffman, Lau & Johnson, 1986; Ellis, 1992; Forbes, Poulin-Dubois, Rivero & Sera, 2008; Sera, Berge & Castillo, 1994). Regardless of the scale (small effects can be telling), language affects how people think, conceptualize, and categorize elements of knowledge. In addition to gender, phonetic and articulatory aspects of languages are also potential influencers, along with cognitive tasks (Naveh-Benjamin & Ayres, 1986).

As John Locke wrote in *L'Essai* (1742), the sphere containing the entire human knowledge, *l'entendement humain*, can be reduced to three elements: physic, ethic, and semiotics. When thinking about language, people think about words, sentences, grammar, etc., but not necessarily about symbols. For most people, symbols are visual elements (e.g. sign language). Nevertheless, language is a symbolic system in the sense that every word intrinsically possesses a symbolism. Words are as powerful symbols as street lights, and therefore language can be described as a semiotic system (De Saussure, 1973). Words have a formal semantic signification; the one found in the dictionary. However, based on de Saussure's (1973) ideas, words also possess an arbitrary semiotic signification that exists in a given social context. A person's unique experience of the world is embedded in their language. This language, shaped by personal experiences, is the main tool a person has to describe their world (Whorf & Carme, 1979). People's ability to *say the world* influences their experience of it. This represents a loose interpretation of the Sapir-Whorf hypothesis, which I will explore more in depth subsequently (Kay & Kempton, 1984).

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People learn a spoken language in a social setting (Ervin, 1964). Because the semiotic of a language is so strongly rooted in a specific social context, it is not possible to translate it from one language to another, unlike the semantic (Benvéniste, 1980). A way to illustrate the incapacity to transpose the semiotic is to refer to idiomatic expressions, which oftentimes lose most of their meaning when translated semantically¹⁸ (Glucksberg & Cacciari, 1991). When exploring idiomatic expressions, Glucksberg & Cacciari (1991) explained that:

“Word meanings cannot be discovered; they must be learned because there is no systematic relationship between the sound of a word and its meaning, or between the individual elements of single-morpheme words and their meanings. The meanings of phrases and sentences, in contrast, can be discovered from the meanings of their individual elements.” (p. 217).

I used idiomatic expressions as exemplars to illustrate the difficulty of understanding the contextual specificities of a given language. By extension, they also provide a rationale as to why the richness of a language is nearly impossible to fully translate. Bobrow and Bell (1973) proposed that:

“idioms are represented in a mental idiom list, separate from and independent of the mental lexicon. When an idiom is encountered, the literal meanings of the words are first examined. Then, if the literal meanings are not interpretable in context, the idiom list is searched.” (in Glucksberg & Cacciari, 1991, p. 218)

The idea that language influences one’s world view can be traced back to the early 19th century, notably in Wilhelm von Humboldt’s work (Kreiner, 2013). However, the more decisive and widely referenced source of linguistic relativity, remains the Sapir-Whorf hypothesis. A central tenet of which is that:

“there are establishable correlations between various aspects of linguistic behaviour and various aspects of non-linguistic behaviour, with the added suggestion, made particularly strong by Whorf in certain passages, that linguistic behaviour is in some sense the independent variable within a cultural context, upon which non-linguistic behaviour is dependent.” (Brown, 2014, p. 10)

¹⁸ Every cloud has a silver lining → The semantic translation would be: *Chaque nuage a une doublure argentée*; while a semiotic equivalent would be: *à quelque chose malheur est bon*.

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To fully embrace a strong view of linguistic relativity one needs to agree that “the structure of language A determines the structure of behaviour in culture A”, and that language possesses a special status rooted in a set of social and historical events (Brown, 2014, p. 11). This is congruent with sociolinguistic notions explained earlier where languages are socially and culturally embedded (Benvéniste, 1980; Slobin, 2013). Therefore, language is not purely a syntactic structure, but also a social structure. It evolves with the people using it, and these people are shaped by their experiences. While the strong form of the Sapir-Whorf hypothesis assumes that language *controls* the ways people think, a weaker version of it states that language *influences* thoughts; it shifts the posture from one of determinism to one of predisposition/inclination (Kay & Kempton, 1984; Kousta, Vinson & Vigliocco, 2008; Kreiner, 2013). Regardless of the strong vs. weak debate surrounding the hypothesis, which is not the purpose of this thesis, it remains that language affects how humans think and reason.

Parents frequently tell children to “turn their tongue seven times before speaking”, and this echoes quite well the notion of *thinking for speaking* (Slobin, 1987, 2003). The following excerpt, by Slobin (1987), illustrates eloquently the role performed by cognitions in the framework of dynamic expressions:

“The activity of thinking takes on a particular quality when it is employed in the activity of speaking. In the evanescent timeframe of constructing utterances in discourse, one fits one’s thoughts into available linguistic forms. A particular utterance is never a direct reflection of “objective” or perceived reality or of an inevitable and universal mental representation of a situation. This is evident within any given language, because the same situation can be described in different ways; and it is evident across languages, because each language provides a limited set of options for the grammatical encoding of characteristics of objects and events. “Thinking for speaking” involves picking those characteristics that (a) fit some conceptualization of the event, and (b) are readily encodable in the language.” (p. 435. As cited in Slobin, 2003, p.158)

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Even scholars rejecting the Sapir-Whorf hypothesis such as Steven Pinker (1989) are still bequeathing value to the notion that language impacts cognitions:

“Whorf was surely wrong when he said that one’s language determines how one conceptualizes reality in general. But he was probably correct in a much weaker sense: one’s language does determine how one must conceptualize reality when one has to talk about it.” (p. 360)

If someone desires to describe how they see the world, they are limited by the lexicon they possess. Hence, language might not determine *how* they see the world as asserted by the strong version of the Sapir-Whorf hypothesis, but it unquestionably shapes the way they are able to *say* it. In the subsequent section I will explore the notion of linguistic relativism through bilingual lenses.

2.3.1 [LINGUISTIC RELATIVITY AND BILINGUALISM](#)

The linguistic relativity hypothesis, whether in its strong or weak formula, implies that the way people see the world is influenced by their language. For instance, their ability to describe their world and their experience of it is limited by the lexicon they possess, their semantic network. Consequently, it is important to inquire regarding how the acquisition of a second language impacts the notion of linguistic relativity. For instance, in regard to if bilinguals have a different perspective of the world compared with monolinguals. Should bilinguals be approached as two monolinguals sharing the same body or, instead, as an entirely unique value proposition of someone moving back and forth between two distinct ways of conceptualizing the world (Hunt & Agnolli, 1991)?

As I mentioned previously, multiple studies established that languages differ in grammatical structure and in gender (e.g. Boroditsky, Schmidt & Phillips, 2003; Dilkina, McClelland & Boroditsky, 2007; Forbes et al., 2008; Pérez-Pereira, 1991; Phillips & Boroditsky, 2003). The examples of the *key* and *bridge* provided insights into how it impacts the choice of adjectives. Another example of contrast is motion. Some languages tend to describe manner and path of motion using a single verb (e.g. he ran down the mountain), while other languages will separate the manner and path of motion (e.g. *Il est descendu de la*

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montagne en courant [He went down the mountain while running] (Kreiner, 2013; Slobin, 2003; Talmy, 1991, 2000). Research showed that the propensity of children to think about motion and gender consistently with the grammatical tendencies of their language fortified as they gained competency, and mistakes rarely occurred (Kreiner, 2013; Blom, Polisenska & Weerman, 2008). By the age of 5 or 6, children have normally acquired nearly all components of linguistic competency in their first language (Kousta, Vinson & Vigliocco, 2008).

Aggregating all of this, cognitions are impacted by a language through its grammar, its uses of gender, its syntax, its cultural rooting, etc. (Benvéniste, 1980; Boroditsky, Schmidt & Phillips, 2003; Kousta, Vinson & Vigliocco, 2008). Even when not speaking per se, the impact of language on the mental activities related to formulating and interpreting is not trivial (e.g. when trying to translate an idea or trying to describe an image being visualized) (Slobin, 2003).

Thus far, the viewpoint of linguistic relativity and bilingualism presented is very much cognitive, and language per se is not overtly analyzed, as is often the case in linguistic relativity scholarship (Slobin, 2003). Lucy (1996) asserted that linguistic relativity:

“should assess the cognitive performance of individual speakers aside from explicitly verbal contexts and try to establish that any cognitive patterns that are detected also characterize everyday behavior outside of the assessment situation” (p.48)

This is an interesting standpoint as it upholds the belief that language is at play when people are not actually engaged in verbal behavior. However, more aligned with the objective of this thesis, some linguistic relativity scholars are concerned with language regarding its *use* and *cultural practice*, reintroducing the notion of *thinking for speaking* mentioned earlier, where cognitions “play a dynamic role within the framework of linguistic expression” (Slobin, 2003, p. 158; Gumperz & Levinson, 1996; Slobin, 1987). Thinking and speaking are consubstantial to such an extent that Brown (1958. As cited in Slobin, 2003) referred to words as *lures to cognition*, and Bowerman (1985) highlighted the

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notion that language is a guide for children to form language-specific semantic categories. In fact, words are so evocative that people can have intense memories of events that they have not lived but simply heard a rendition of (Piaget, 1962). Also, looking at the work of Ervin (1955, 1961, 1964) and Rubin (1962), there is strong empirical evidence that, at a semantic level, the bilingual individual may differ in each language. Within the same language, for instance French, diaphasic variations exist. An individual can master different vernaculars allowing him/her to adjust to various situations. Indeed, people may not express themselves the same way with their friends as they would during a work interview. In studies, similar variations appeared to occur across languages where the personality of the speaker differed when speaking in L1 vs. in L2. Sociolinguistic variations therefore exist *within a language* and *across languages* (Ervin 1955, 1961, 1964; Rubin 1962). This relates to what I mentioned formerly regarding language being social in nature, leading to the possibility of nonidentical semantic networks in L1 and L2. Supporting the claim that language, environment, and cognition are cohabiting, Bickel (2000. As cite in Slobin, 2003) stated that:

Correlations between language and cognition often attest to a unidirectional link from public language to private thinking. Correlations between linguistic and cultural patterns, however, suggest mutual influence, since both speaking and social behavior are publicly shared activities that are transmitted across generations. Thus, language and non-linguistic practice together construct a relativized cognitive ground. From this perspective, Whorfian effects do not obtain between modules of isolated minds, but are fundamentally embedded in a habitus of public practice. (p. 185)

The ability to speak is strongly limited by the lexicon a person possesses. Words are the ultimate limitation of speech. Language is also deeply rooted in a sociocultural context. Analogous to what I wrote above on creativity and idea generation, language is too a semantic network of words linked to describable realities and concepts¹⁹. Individuals acquire their knowledge through semantics,

¹⁹ Ideas exist in a network of knowledge. The clusters of knowledge (and related concepts) that are often used (habitual) will be more quickly activated when looking for ideas. But, this will lead to more ubiquitous concepts. Original ideas mostly reside in the deeper and more difficult to access parts of the network of knowledge. It is

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store their knowledge according to semantics²⁰, and then used semantic networks to express their networks of knowledge; they are consubstantial.

Language impacts how individuals describe their world. Pertaining to bilingualism, the lexicon in L2 might be more limited depending on proficiency, and the sociocultural rooting between L2 and L1 might differ. Therefore, a bilingual person might not be identical in both languages for experiences related to each differ. For instance, people less proficient in their secondary language, possessing a limited lexicon compared with their mother tongue, might be more insecure, and it can impact their experiences and perspectives. They might struggle to articulate their experiences in that language. Conversely, it is conceivable that some native French-speakers be more comfortable communicating in English when discussing specific subjects. For example, even though French is my mother tongue and remains my primary language overall, my networks of knowledge and semantic networks related to my education and research are undeniably richer in English as most of my graduate education and work happened and still happens in this language²¹. Experiences shape individuals' networks of knowledge and semantic networks. Even for a truly bilingual individual such as myself, language A may not be a perfect mirror of language B. The information is there, stored in the global networks of knowledge, but it might prove substantially challenging to articulate some elements in either L1 or L2, especially if it has not been done regularly in that language previously, and the words to describe them are not easily retrievable from the semantic network currently primed. However, higher bilingual proficiency would increase the confidence of being able to replicate A in B (and vice-versa) if needed.

harder to reach because it is not instantly activated when a problem or task arises and requires a solution. Often, it will be necessary to deplete the bank of habitual ideas, *get them out of the way*, to then be able to generate solutions that are innovative. Semantic networks are similar as when looking for words to describe something, the first ones that will come to mind are those used to describe the ubiquitous and habitual. In that sense, ideas/solutions/answers/concepts become synonymous with *words*. These original words that are required to describe original thoughts are more remote in the semantic networks.

²⁰ long-term memory is assumed to be organized as a network of semantically related knowledge (Nijstad & Stroebe, 2006; Nijstad, Stroebe & Lodewijkx, 2002; Rietzschel et al., 2007)

²¹ This reality is a reason why I paid attention to select a creative ideation task that was not domain specific. I will present this further when introducing the experimental protocol in a subsequent section.

2.4 CONCLUSION OF THE LITERATURE REVIEW: UNITING THE THEORIES

Creativity is a process of rejuvenation to find new and fresh approaches. It is about the ability to surpass the habitual knowledge people become so easily fixated on to generate ideas that are original and expansive. Brainstorming is a powerful method to foster these kinds of ideas. It nurtures and stimulates divergent thinking and can be efficient to overcome the fixation effect²². Resultantly, it facilitates creative ideation and contributes to people's ability to dive into the hard to reach territories of their networks of knowledge; those inhabited by truly rare ideas and clusters of unusual concepts. To articulate these ideas, words are compulsory and semantic networks become vital. A richer lexicon implies that a person can say more and that more numerous realities can be described. Therefore, networks of knowledge and semantic networks are consubstantial. Indeed, people need words to say what they know, and they have often learned what they know through semantic. Nodes of knowledge in the networks are connected to corresponding nodes of semantic allowing the articulation of the information. This reintroduces the linguistic relativity notion of cognitive categories being limited by linguistic categories. Connecting this with bilingualism, while research showed a positive relationship between bilingualism and multilingualism and creative cognitions, there is a lack of studies looking at verbal creative ideation in a secondary language. The potential of smaller semantic networks is concerning as it would mean that people are less able to retrieve and describe the information from the networks of knowledge²³, which can also be more limited in L2²⁴. Bilinguals and multilinguals may have more creative cognitions globally, but these are trapped inside unless the lexicon is available to articulate them.

²² The fixation effect is when spontaneously activated type of reasoning occurs during the execution of a creative ideation tasks and it blocks further exploration (Purcell & Gero, 1996; Agogué et al., 2015). People are stuck on habitual thinking and innovation is hindered.

²³ The knowledge might actually be there, but the lexicon to articulate it in L2 might not be available in the L2 semantic network.

²⁴ Furthermore, there is the possibility that in L2 semantic networks and network of knowledge will be unevenly developed in favor of domain-specific areas corresponding to the environments in which L2 was acquired and is primarily used.

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The effects of working and ideating in L2 remains mysterious as there is little research looking at the phenomenon. My aim is to contribute to this understudied field by using Quebec's bilingual reality as a case study since French-speaking Quebecois.es oftentimes have to communicate and perform work tasks in English, whether to accommodate or simply because they desire to. I used the theories mobilized in the context and in the literature review to design a research problematic that I introduce in the ensuing section.

3 DESIGNING A COMPELLING RESEARCH PROBLEMATIC

The historical and sociolinguistic portrait I detailed formerly contributed to enrich the understanding of the linguistic dynamics in Quebec. It remains a diglossic society where linguistic insecurity subsists and where the perception that English is the *lingua franca* of business endures. Indeed, French Canadians do not expect to be able to exclusively speak French when conducting business or working in organizations. Oftentimes, they volunteer from the beginning to adopt English as the accepted vehicular language. It is an implicit norm that Quebecois.es will be the ones adapting their linguistic behavior in light of what has long been a unidirectional bilingualism. This is a central tenet of this study: even in Quebec, French-speaking Quebecois.es have to execute portions of their work in English.

As explained earlier, Quebec is renown as an international creativity hub, and bilingualism is often heralded as a key factor for it. But while this makes for a great narrative, what are the impacts of working in L2 on the ability to express one's creative ideas?

To study this phenomenon, I explored literatures on creativity, brainstorming and idea generation, and linguistic relativity and bilingualism to build solid conceptual foundations. An interesting concept that emerged in all the literatures is the one of network. Brainstorming and idea generation are about fostering divergent thinking to go beyond the networks of habitual thinking, the

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proximal and closely interconnected nodes/clusters representing ideas (and related concepts) that are common and regularly used, to reach truly creative ideas residing deeper in the distant, and less frequently accessed, territories of the networks of knowledge. This is the process enabling creativity. The concept of network is also prevalent in relation to language as it is structured as semantic networks of conceptual categories and words associated with them. These networks and the lexicon mastered are colossal parts of the ability to express creativity since, when generating ideas, people are limited by the words they know. During a verbal ideation, people cannot communicate ideas that they cannot articulate. Therefore, the cognitive categories are limited by the linguistic categories. Thus, this intertwining notion of network is fascinating. The semantic networks enable to *say* the networks of knowledge and the latter was acquired heavily through semantic.

While the literature accounts for bilingual cognitions, it barely accounts for what it means to, not just be bilingual, but to work in a secondary language. This is a vital issue in Quebec's contemporary organizational life. Knowing that bilingual and multilingual people are more creative than monolingual people cognitively is definitely interesting as per de literature referenced previously, but not enough to understand the unique bilingual reality of Quebec. Quebec is one of the few truly bilingual societies, and this stands even truer for the city of Montreal. Accordingly, it is crucial to find an answer to this research question:

What are the impacts of working in a secondary language on
creative idea generation?

I decided to use an experimental approach to test the relation of interest (I will further explain this choice in the ensuing section), I defined the following 5 hypotheses based on the established measures extensively used in experimental creativity research using idea generation task (Agogu e et al., 2014, 2015.)

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H1: Working in a secondary language diminishes fluency

Fluency refers to the number of ideas generated (Agogu , 2012); more solutions generated to answer a given problem will yield a higher fluency score. I expected that people would be more comfortable speaking in their mother tongue²⁵. It is more natural and in the context of this research, where participants had to engage in brainstorming, I expected that it would make it possible for participants to *just produced* ideas while facing less obstacles. For instance, participants ideating in a secondary language might have to expend energy on translating ideas and on searching for specific words. In L2, the semantic networks can also be more limited in breadth and depth²⁶. Because of this and of a more restricted lexicon, potentially more limited networks of knowledge, and occasional need to search in the first language and to translate, I posited that working in a secondary language would diminish fluency.

H2: Working in a secondary language improves originality.

Originality refers to the “unique character or rareness of each answers compare to the entire set of answers” (Agogu , 2012, p. 75). As mentioned in the literature, relying on habitual thinking is a natural bias as humans tend to follow the path of least resistance. In other words, when facing a problem, tried-and-true methods will be the first to emerge. People select the first solution they can think of, that they know will work to solve a problem, and then generate all the derivatives from this idea until depletion of the cluster of concepts. They then move on to the next most proximal idea in their network of knowledge. However, the more associations they have to the concepts, the more time it will take for them to move to less ubiquitous ideas and distant clusters/nodes.

I posited that in a secondary language, concepts would often exist in smaller clusters with fewer associations (words), and that there would be fewer interconnectedness between clusters. Because of assumed smaller, or less dense,

²⁵ This holds true if the mother tongue remains the dominant language, and this is the assumption made for this research project. It was also a criterion for the sampling strategy, which will be discuss subsequently.

²⁶ Because the nature of the task that was used during the experiment is general, the notion of domain specific knowledge in a given language was not taking into consideration when crafting the hypothesis. It might have come into play for some participants, but the task was not deemed specific enough to make an issue out of it.

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semantic networks, I theorized that working in a secondary language was potentially able to quicken the process of depletion. The bank of ideas resulting from habitual thinking would be smaller and the process to move on to more distant and unusual concepts in the network of knowledge of participants would be hastened. In other words, being less able to access and articulate knowledge in a secondary language would push people to be more original as they would have less to rely on in term of habitual thinking to just *keep generating* without really having to push their reflection. Thus, I hypothesised that working in a secondary language would improve originality.

H3: Working in a secondary language improves expansivity

When generating ideas during ideation tasks, the majority are quite ubiquitous and often repetitive across most people trying to generate solutions to these creative problems. As explained above, approximately 81% of the answers will fall into the same three categories: damping the shock, protecting the egg, and slowing the fall (Ezzat et al., 2018). Ideas outside these three routine categories are considered expansive. Expansivity is a hybrid criterion that is both qualitative and quantitative (originality is purely qualitative), it is the *number* of very original ideas outside the fixation effect.

Based on the same rationale presented in H2, I posited that by making people work in their L2 their reserve of habitual knowledge would deplete more quickly. This would make them generate ideas that are innovative by forcing them to dive into more remote territories of their networks of knowledge inhabited by these kinds of expansive ideas. Hence, I hypothesised that working in a secondary language would improve expansivity.

H4: Working in a secondary language improves flexibility

Positing again that semantic networks and networks of knowledge (the ability to express them) are globally more limited in a secondary language (smaller clusters with fewer associated concepts and less interconnectedness between clusters), I supposed that people working in a secondary language would be more flexible.

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Flexibility refers to the number of unique conceptual categories explored by a person during a creative ideation task (Agogu , 2012)

In a secondary language, there would be fewer descriptors associated with each concept and there would likewise be fewer directly related concepts. Consequently, people ideating in L2 would move more between conceptual categories as each would get depleted more quickly. They would leap between distinct nodes in the network, and each distinct node would represent a different conceptual category with a cluster of concepts belonging to that conceptual category. Generating a greater number of unique conceptual categories would indicate greater flexibility. I hypothesised that working in a secondary language would improve flexibility.

H5: Working in a secondary language diminishes fixation

Building on the first and third hypotheses, working in a secondary language would imply more limited semantic networks and a lowered ability to articulate the information in the networks of knowledge. As a result, the bank of habitual information would get depleted more quickly. This phenomenon would push people toward exploring less habitual thinking related ideas and more uncommon conceptual categories, which would mean more expansivity. Resultantly, this would decrease the fixation effect since a larger ratio of expansive answers would indicate lower fixation. By having fewer words to linger on describing the usual, people ideating in a secondary language would be pushed into expansive territories and outside the fixation effect. Therefore, I posited that working in a secondary language would diminish fixation.

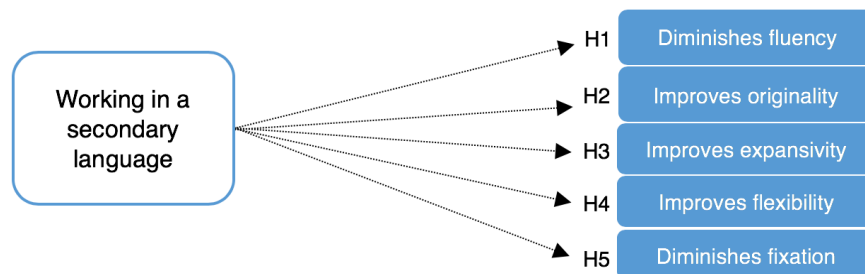


Figure 3: Hypotheses

4 **METHOD**

To evaluate the impacts of working in a secondary language on creativity, I designed an experimental protocol. I selected a controlled experiment because I wanted to gain insight into cause-and-effect by manipulating a specific independent variable, language, and to be able to replicate the study in the future. This method was well suited to compare two conditions (control and experimental) and to objectively and analytically refute or support my hypotheses. It is also a method extensively utilized in the literature on creativity using various independent variables and creative ideation tasks, such as the hen's egg task, which I will soon introduce (e.g. Dijksterhuis & Meurs, 2006; Silvia et al., 2008; Agogu e et al., 2014; Agogu e et al., 2015; Cassotti, Camarda, Poirel, Houd e & Agogu e, 2016).

I designed a protocol comprising three phases. With this procedure I aimed to monitor for numerous variables with a technical survey (phase 1), test participants' creativity with a verbal ideation task (phase 2), and gain insights into their cognitions with a reflective questionnaire post ideation task (phase 3).

More specifically, phase 1 aimed at assessing strict variables: language proficiency (Marian, Blumenfeld, & Kaushanskaya, 2007) and self-assessed creativity (Zhou & George, 2001; George & Zhou, 2001), and phase 3 aimed at providing insights into the participants' cognitive process pertaining to their experience while performing the creative ideation task (translation, visualization, etc.). In this section, I will explain how I selected and recruited the participants, developed and administered the protocol, and analyzed the data.

4.1 **PARTICIPANTS**

4.1.1 SAMPLING STRATEGY

The objective of my sampling strategy for this project was to focus on graduate students and young professionals in business or science/research related fields where divergent and critical thinking are taught, valued, and used (e.g. marketing, technology, communications, law, research, etc.). Indeed, managerial and

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strategic implications remained a clear focus of this study when defining the sampling strategy for creativity is a powerful lever for innovation. Fields such as accounting and finance were avoided, not because people in those fields cannot be creative but because, by discussing with HEC Montréal professors, it was established that the curriculums of these fields are more focused on application of theories than on a critical approach to their respective fields. It was a sampling decision I made based on the information available.

Another critical criterion was that participants had to have French as their first language and English as a secondary language. Their level of proficiency in L2 could vary greatly as I wanted variance (from limited proficiency to full bilingualism) to observe if the level of fluency in L2 would impact their creativity in both L1 and L2.

In summary, I wanted to recruit native francophones who were graduate students or young professionals (no older than early 30s) in creative fields, who were proficient in English at varying degrees, and who had never performed the hen's egg creative ideation task. Within those parameters, I used a convenience sampling method, while also paying attention to gender distribution.

4.1.2 THE CHALLENGE OF RECRUITING.

The primary sources I used to recruit participants were personal and professional networks, social media, and referrals from contacts and past participants of the study. I designed an explicative poster and shared it on social media and mailing lists to attract and inform potential candidates (see appendix 5). Due to the need for a closed room to administer the protocol, the potential participants had a choice of locations: McGill University, HEC Montréal or, if centrally located, their workplace.

I compensated the participants for their time with a \$40 gift card²⁷. Their participation required 30 to 45 minutes, and some had to travel to the selected location. Even with the compensation, the recruitment process grew complicated

²⁷ The gift cards selected by the participants were primarily from the following retailers: Amazon, Indigo, Sephora, and Cinéplex.

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and time consuming for many reasons²⁸. My personal and professional networks turned out to be considerably more anglophone than foreseen. Also, even though they were compensated, participants had a strong tendency to reschedule their appointments at the last minute, often more than once. Lastly, many candidates were disqualified while doing the experiment as I discovered that, contrary to what they had stated²⁹, French was not their mother tongue³⁰. This situation occurred a surprising eight times. Those candidates were not compensated with a gift card as they had misrepresented their linguistic profile.

I successfully recruited 30 qualified persons. I separated them into two groups randomly, but still paid attention to gender distribution. I had a relatively even distribution of graduate students and young professionals in both groups (50/50). All the participants had spent the majority of their life in a francophone environment (Quebec or France).

Table 2: Groups' constitution

Group 1 – Generating in L1	Group 2 – Generating in L2
15 participants	15 participants
5 men	7 men
10 women	8 women
Average age: 26 years old	Average age: 26 years old

4.2 PROTOCOL DESIGN AND DATA COLLECTION PROCEDURE

In this section, I will introduce a detailed explanation of the three-phase experimental protocol and of how I administered the protocol to be rigorous and to create conditions that were consistent across participants.

²⁸ The option of hiring a recruitment firm who would have been able to deliver a sample perfectly aligned with the sampling strategy was contemplated, but the cost was prohibitive, and I decided against it.

²⁹ When being contacted to take part in the research project, I always asked prospective participants if French was their mother tongue. If their answer was *no*, I thanked them and informed them that unfortunately they were not meeting the sampling requirements.

³⁰ In all those cases, their actual first language was Arabic, which I have no knowledge of. If English had been their first language, I would have conducted the experiment and treated the data separately. Something I wanted to avoid in the context of this study was to look at Anglophones ideating in English versus Francophones ideating in French. In the scope of a bigger study I would be interested in looking at more diverse linguistic and bilingual profiles.

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4.2.1 [PRE-QUESTIONNAIRE: DEMOGRAPHIC VARIABLES.](#)

When looking to gain insight into cause-and-effect with an experiment, it is paramount to monitor for as many variables as possible to isolate the relation of interest. It reduces the noise, allows to see more clearly, and increases the validity and certainty of the findings. For this study, demographic variables I monitored with the pre-questionnaire to obtain comparable groups were³¹:

- Age;
- Occupation;
- Confirm French as L1;
- Confirm English as L2 and assess the proficiency in L2;
- Acknowledge the presence of other languages and assess the level of proficiency in them;
- Amount of exposure to the different languages in their current environments;
- Self-assessed creativity.

I built this questionnaire (see appendix 2) using and adapting instruments already existing in the scientific literature. They are described in the ensuing subsections. I translated the instruments from English to French as the participants were francophones and the setting of the experiment was also in French. I included on the cover page a standard consent form informing the participants that their individual data would remain confidential. This questionnaire was composed of the following sections:

Language proficiency

This section consisted of a language proficiency and experience questionnaire (LEAP-Q; Marian, Blumenfeld, & Kaushanskaya, 2007). The survey aimed to assess the linguistic profile of the participants by evaluating their L1, their L2 (and other secondary languages), the order of dominance, the order of acquisition, the environmental exposure to the different languages³², the mediums through which they had learned the different languages, the mediums

³¹ I included a Big 5 personality traits (Donnellan, Oswald, Baird, & Lucas, 2006) in the questionnaire, but since it yielded no significant results for this study, I will not discuss it further.

³² For the context of this research project, I decided to consider Quebec as a francophone environment, based on the official language policy, and on the fact that almost all native francophones attended francophone elementary schools and high schools. This meant that people having spent 20+ years here could not state that they had spent 20+ years in an anglophone environment.

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through which they were currently exposed to the different languages, etc. (see appendix 3).

I adapted this instrument by making the first detailed language section specific to the participants' mandatory L1, French, by removing the last two questions ("In your perception, how much of a foreign accent do you have in language X?" and "Please rate how frequently others identify you as a non-native speaker based on your accent in language X.") as they were irrelevant to a L1 assessment. I included space for up to four secondary languages, and no participant needed more than that. I instructed the participants to include all secondary languages in which they were able to hold a conversation.

Self-assessed creativity scale

This second section consisted of a self-assessed creativity scale (Zhou & George, 2001; George & Zhou, 2001; see appendix 4). That section comprised 14 questions; 13 were directly from the sourced instrument, and I added an additional question³³ ("I am a creative person"). I provided a short scenario to the participants to put them in context. The scenario stated to think as a student working on a team project or as a young professional working in an organization. It was to prime their creativity in work situations and not in terms of their potential hobbies or interests. The literature suggested the use of a 7-point scale, but I used a 6-point Likert-scale to avoid the possibility of adopting a neutral position (George & Zhou, 2001).

4.2.2 [CREATIVE IDEATION TASK: CAN THEY SAVE AN EGG?](#)

Following the completion of this initial survey, the participants performed individually a creative ideation task. I separated the participants into two groups; one ideating in L1 (control condition), and one ideating in L2 (experimental condition). Based on prior uses of this task in the literature (e.g. Agogu , 2012;

³³ I added this question to see if there would be a discrepancy between the more subtle questions from the sourced instrument evaluating their creative behavior and this more direct question. For instance, I wanted to see if a participant got a low creativity score based on the 13 original questions, but still self-described as creative on the "I am a creative person" question. It was a way to somewhat diminish the bias of a self-assessed questionnaire.

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Agogu  et al., 2014; Ezzat et al., 2018) I allotted the participants 10 minutes to verbally generate as many solutions as possible to the following problem: *Ensure that a hen's egg dropped from a height of 10 meters does not break.*

For both groups, I provided the instructions in French. I informed each participant that the task would last the full 10 minutes and that while they could stop generating ideas whenever they wanted they could not terminate the experiment before the full 10 minutes had elapsed. I told the participants that their verbal ideation would be audio-recorded (they signed a consent form to that effect). I mentioned to the participants that there was neither good nor bad answers and that they should approach the task as a verbal brainstorming while also respecting the assigned language, either L1 or L2, and resist any urge to switch from one to the other.

To create rigorous and consistent conditions, I instructed the participants that there would be no interaction between them and me, the experimenter. I ensured that they were positioned as to not be able to see me to avoid them witnessing any potential non-verbal feedback.

4.2.3 [POST-QUESTIONNAIRE: COGNITIVE INSIGHTS – WHAT WENT THROUGH THEIR MIND?](#)

When performing a task and generating ideas, a lot happens in someone's mind. Unfortunately, as an observer, it can be extremely difficult to see those mechanisms. Experimenters must find ways to gain access to that *black box* full of information. The point of having a survey following the execution of the creative ideation task was exactly that: get insights on what happened in the participants' heads; Get into the *black box*. For instance, half the participants were made to work in a secondary language. As a result, I found essential to investigate if they had to translate their ideas in order to verbalize them in L2 or if the ideas emerged in the assigned language. For all the participants, I was also curious to know if the ideas emerged as a network stemming from a particularly

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dominant idea, and if their ideas arose as images that they then described³⁴. The main aim of these questions was to contribute to the sensemaking of the results of the hen's egg creative ideation task. I designed the following three questions and used a scale ranging from *almost never/never* to *almost always/always*:

1. Au cours de la tâche, à quelle fréquence les idées se sont-elles générées dans votre langue maternelle, vous forçant ainsi à les traduire? [*During the task, at what frequency did ideas emerge in your mother tongue, forcing you to translate them?*]
2. Au cours de la tâche, à quelle fréquence les idées se sont-elles manifestées à travers des images que vous avez par la suite décrites à l'aide de mots? [*During the task, at what frequency did ideas emerge through images that you subsequently had to described with words?*]
3. Au cours de la tâche, à quelle fréquence plusieurs de vos idées ont-elles découlé d'une même idée particulièrement dominante? [*During the task, at what frequency did your ideas derive from a single particularly strong idea?*]

For participants generating in L1, the first question was replaced by :

1. Au cours de la tâche, à quelle fréquence les idées se sont-elles générées dans une autre langue que votre langue maternelle? [*During the task, at what frequency did ideas emergd in a language that was not your mother tongue?*]

In the end, I administered this protocol on the 30 participants individually. My objective was to establish a *ceteris paribus* assumption allowing to consider language (independent variable) as the only changing variable, and to observe its impacts on creative ideation (dependent variable). Figure 4 shows the protocol.

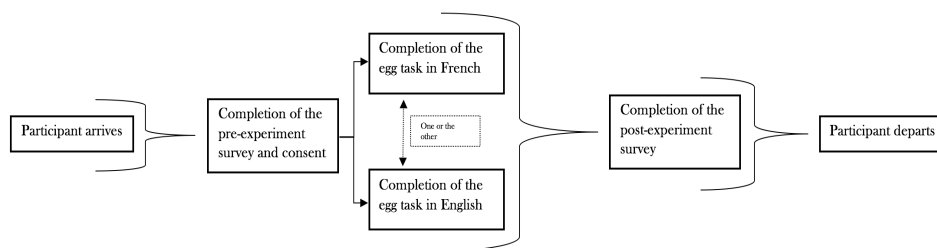


Figure 4: Experimental protocol design

³⁴ Originally, in addition to these questions I designed, I had selected an instrument from the scientific literature. The instrument was a self-perceived 33-item creativity scale from a design perspective (Kreitler & Casakin, 2009). This instrument had been designed as a reflection tool for architects performing a design task (design a museum in a described context) and measured 21 indicators. However, contrary to the literature, in the context of this study, there was no internal validity found to the instrument during the analysis. The original setting for which this instrument was created was considerably more homogeneous and specific – design students having to design a museum. It is possible that the more heterogenous sample and less tangible task used in this thesis led to these results. Therefore, I removed it and it will not be discussed further at this time.

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4.3 DATA ANALYSIS

4.3.1 QUESTIONNAIRES

I transcribed all of the survey answers into an Excel spreadsheet. I then conducted analysis. I will describe the process in the subsequent subsections.

Language proficiency

Through the LEAP-Q (Marian, Blumenfeld, & Kaushanskaya, 2007), I observed that my two groups were comparable. The participants were similar regarding gender, age, number of languages spoken, and self-assessed proficiency in L2 (speaking, understanding, and reading; see table 3). The occupations of the participants aligned with the desired fields of studies and professions. All the participants had spent the majority of their life in a francophone environment (Quebec or France).

Additionally, in the questionnaire, they indicated comparable level of current exposure to L1 in their environment. Group 1 members indicated being exposed to L1 on average 69% of the time in their present environment, while group 2 members indicated 63.4%. Seeing that high level of similarities on the demographic variables between both groups validated their comparability before the manipulation.

Table 3: Groups' comparison

Group 1 – Generating in L1	Group 2 – Generating in L2
15 participants	15 participants
5 men	7 men
10 women	8 women
Average age: 26 years old	Average age: 26 years old
Average number of languages spoken: 2.5	Average number of languages spoken: 2.5
Self-assessed speaking fluency in L2: 8.1/10 (SD=1.24)	Self-assessed speaking fluency in L2: 8/10 (SD=1.39)
Self-assessed understanding fluency in L2: 9.4/10 (SD=0.50)	Self-assessed understanding fluency in L2: 8.7/10 (SD=0.87)
Self-assessed reading fluency in L2: 9.7/10 (SD=0.90)	Self-assessed reading fluency in L2: 8.5/10 (SD=1.06)

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Self-assessed creativity scale

Though this instrument was directly from the literature and had a high level of internal validity ($\alpha=0.96$) (see appendix 4), based on the correlations from this study's data, 6 items seemed to not have directly measured the desired creativity construct. I removed those. The Cronbach's alpha for the resulting 8-item questionnaire was 0.81, indicating that the instrument's content was valid and an effective measure of creativity (see appendix 6 for correlation matrix). The self-reported creativity score was on average 4.79/6 for the group ideating in L1 (SD=0.66) and 4.55/6 for the group ideating in L2 (SD=0.53)³⁵. The near identical self-reported creativity score indicated that the population in my two conditions (control and experimental) were homogeneous on that factor which, in addition to the high level of similarities on the demographic variables explained in the previous section, further validated the comparability of both groups before the manipulation.

Reflective post creative ideation task survey

I calculated the average to evaluate the prevalence of translation for the participants generating in L2 (M=2.8/5; SD=1.32). Then, for both groups, I calculated averages for the frequency of ideation through images (M=4.4/5; SD=0.67) and through derivation from a particularly dominant single idea (M=4.04/5; SD=0.65); for these two questions, the results were the same between both groups and I aggregated them. Again, the aim of these questions was to contribute to the sensemaking of the results.

4.3.2 CREATIVITY IDEATION TASK RECORDINGS

Langage proficiency

As mentioned above, in the pre-questionnaire participants had to assess their proficiency in L2 (see table 3 above). However, to enhance the precision and objectivity, I had the recordings of the participants doing the creative ideation task in L2 (experimental condition) rated externally. The aim was to have an

³⁵ Since the scores are so homogeneous, I did not use the self-assessed creativity data further.

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impartial measure of their proficiency in L2 by having qualified raters assess the English of the participants on the recordings on a scale from 1 to 10. I selected two coders (in addition to me). They were both native anglophones. One had been an English as a second language (ESL) teacher, and one was currently an ESL teacher. The coding was triple-blind and the Cohen’s kappa value was 1, indicating perfect interjudge agreement. The average speaking proficiency across the 15 participants ideating in L2 was 7.5/10 (SD=1.37)³⁶, which was slightly lower than the 8.0/10 (SD=1.39) from the self-assessed pre-questionnaire.

4.3.3 [CREATIVITY IDEATION TASK ANSWERS](#)

Creative fluency

For each of the 30 recordings, I transcribed the solutions generated by the participants into an Excel spreadsheet. Since the task was a verbal brainstorming, there was a lot of mumbling on the recordings as well as partially enunciated ideas and repetitions. For this study, I transcribed only complete ideas and did not take into account repeated solutions while counting the participants’ number of answers (fluency measure). Table 4 presents a few examples of situations encountered in the transcription phase and how I managed them.

Table 4: Transcription issues and solutions

Situations	Treatment
Participants saying <i>wrap the egg in something</i> or <i>put something under</i> as solutions at the very beginning of the ideation process.	Considered complete answered.
Participants saying <i>wrap the egg in something</i> or <i>put something under</i> as solutions later in the ideation process.	Did not considered those complete answers, but rather part of the participants trying to refocus themselves. Consequently, they were not transcribed.
Participants saying answers, such as <i>parachute</i> , multiple times.	Only the first mention was accounted for.
Participant saying answers with multiple components, such as <i>putting the egg in a basket attached to a parachute</i> .	The components were separated and only accounted for the answers that were new. For instance, in the example given, if parachute had already been mentioned, only basket would have been transcribed. If both components were new, <i>parachute</i> and <i>basket</i> would have been treated as two individual answers.

³⁶ I wanted a distribution that was closer to a normal distribution, but it did not happen, in part because of the small sample size. Also, finding graduate students and young professionals in Montreal who are highly unskilled in English is challenging.

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Originality

Originality refers to the “normalized statistical infrequency of a particular solution” (Cassoti, Camarda, Poirel, Houdé & Agogué, 2016, p. 149) or the “unique character or rareness of each answers compare to the entire set of answers” (Agogué, 2012, p. 75). The 30 participants generated a total of 403 solutions to the hen’s egg task. To determine the originality, a rater and I coded each answer following a CAT (Amabile & Mueller, 2011). The process was double blind, meaning the rater and I independently coded all of the answers without being cognizant of each other’s coding. We rated the answers according to the categories in which they belonged as per a list of 61 conceptual categories existing in the creativity literature (Agogué et al., 2014; Agogué et al., 2015). Table 5 presents a few categories and exemplars of corresponding answers. Based on the list defined by Agogué and colleagues (2015), each category is worth a specific originality score, and an answer belonging to a given categorie was awarded that accompanying score. The coding was deemed congruent if we both put the same answer in the same category. Disagreements were discussed until we reached consensus. The Cohen’s kappa was 0.975, indicating near perfect interjudge agreement. This coding was also the basis to assess expansivity and fixation, which I explain in the following section.

With these rated answers, I computed two originality scores for each participant. The first was the average of all the scored answers of a given participant (e.g. if the participant had generated 14 answers the 14 scores were averaged) (referred further on as “average originality”). The second was the average of the two best rated answers, which is a newer approach and a subset of the first method (named further on as “TOP 2 originality”; Silvia et al., 2008). Silvia and colleagues (2008) recommended the analysis of both kinds of scores for reliability, and I chose to abide by this advice to increase richness and precision. These scores are available in table 6.

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Table 5: Coding categories and corresponding Answers

Categories	Examples
Damping the shock	Put pillows on the group
Protecting the egg	Wrap the egg in bubble wrap
Slowing the fall	Use a hot air balloon
Interrupting the fall	Install a net
Acting before the fall	Not really dropping the egg
Acting after the fall	Replacing the egg with an unbroken one
Using a living device	Teach a bird to catch the egg
Modifying the properties of the egg	Filling the egg with concrete
Using natural properties of the egg	Dropping the egg on its most robust axis
Using the properties of the environment	Changing the gravity

Expansivity and fixation

I based the analysis for expansivity and fixation on the same coding used to evaluate originality in the preceding section. Expansivity is the number of very original answers that belong to conceptual categories outside the fixation effect³⁷ (Agogu e et al., 2015). Ezzat and colleagues (2018) have determined over more than 5 years of work using the hen’s egg creative ideation task that around 81% of the answers produced were inside the fixation effect and belonged to only three conceptual categories: damping the shock, protecting the egg, and slowing the fall. Therefore, I assessed all the answers belonging to those three categories as non-expansive and within the fixation effect. Thus, the expansivity rate is the percentage of answers that are outside those three categories (see table 6), and indicates the level of fixation.

Flexibility

Flexibility refers to the number of conceptual categories explored by the participants during the creative ideation task (Agogu e, 2012). To calculate it, while coding the answers for originality, the rater and I kept track of how many unique conceptual categories each participant had generated. Because more than one answers can belong to the same conceptual category, the flexibility score can

³⁷ Fixation is fluency minus the expansivity. In other word, by subtracting the non-expansive answers from the total number of answers (fluency) we get the number of expansive ideas; By dividing that number by the total number of answers we get a percentage that tells us the percentage of answers that are outside the fixation effect and this is how we can say if participants are more or less fixated.

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be lower than the fluency score, which is the total number of answers produced. These scores are available in table 6 below.

Table 6: Mean scores (standard deviations) for fluency, flexibility, originality, and number of expansive solutions outside the fixation effect.

Group	Fluency	Flexibility	Originality Average	Originality Average Top 2	Expansivity/ Expansivity rate
English	11.87 (5.04)	9.6 (3.52)	4.99 (0.40)	7.1 (0.98)	3.93 (3.45)/ 28%
French	15 (5.24)	11.2 (3.60)	4.95 (0.53)	7.2 (0.91)	5.47 (2.64)/ 38%

4.4 VALIDITY AND LIMITATIONS OF THE PROTOCOL

Internal validity

As mentioned above, in the pre-experiment survey, I included a self-assessed creativity scale that I selected from the literature and translated into French (Zhou & George, 2001; George & Zhou, 2001). While performing statistical analysis, as explained previously, some questions from the scale did not seem to measure the desired construct, creativity, and they were removed. The Cronbach's alpha for the resulting 8-item questionnaire was 0.81, indicating that the instrument's content was valid and an effective measure of creativity.

The core element of my experimental protocol was the creative ideation task (hen's egg), which possesses strong face validity. Indeed, it is a non-domain-specific task that is easy for non-experts to comprehend and execute. It is also a task with no clear good or bad answers. As a result, it is conducive to divergent thinking, which is highly desirable when trying to evaluate creativity. While the task was limited to verbal creativity (i.e. it is not designed to account for spatial or motor skills), it was an appropriate tool to obtain a valid idea of participants' creativity in this study. However, the verbal ideation did not allow me to know which ideas were the product of translation or had faced barriers to be articulated. This is a limitation of the designed protocol that will have to be addressed in further studies.

Furthermore, I put a strong emphasis on diminishing selection bias ensuring that the experimental condition group and control condition group were

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comparable. Overall, I believe that the protocol designed and used, while not without limitations, was appropriate to answer the research question and evaluate the impacts of working in a secondary language on creativity.

External validity

Regarding the external validity of the research process, the small sample size of this study (30 participants) and the focus on a single bilingual profile are important limitations constraining the magnitude of the results and their generalization. In future studies, having a larger sample would be paramount in order to draw more unequivocal conclusions. Moreover, the sample was representative, but of a small homogeneous population of young graduate students and professionals in specific fields, with French as their mother tongue and English as the evaluated L2. To have results that are fully unambiguous and generalizable, in addition to more participants, it will be essential to account for more varied bilingual and multilingual profiles. In the ensuing section I will introduce the main results of this study.

5 RESULTS

H1: Working in a secondary language diminishes fluency

My first hypothesis posited that I expected working in a secondary language to decrease fluency. Consequently, I predicted people performing the creative ideation task in L2 to generate fewer answers because, even for people fluent in L2, there could be more limitations and possible blockages than when speaking in L1 (e.g. more limited semantic networks, need to translate, etc.).

A Student's t-test showed statistically significant evidence ($p < 0.05$) that there was a difference in fluency (number of answers) between the group performing the creative ideation task in L1 and the group performing

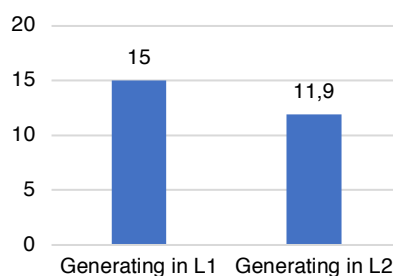


Figure 5: Average number of answers generated during the 10 minutes creative ideation task.

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the creative ideation task in L2. Indeed, I observed a difference in the average number of answers generated: 15 answers on average for participant performing the task in L1 (SD=5.24) and 11.9 answers on average for participants performing the task in L2 (SD=5.04) (see figure 5). Hence, the results allow me to confirm H1: working in a secondary language diminished fluency.

H2: Working in a secondary language improves originality.

My second hypothesis posited that I expected working in a secondary language to enhance originality. Referring back to the literature, I anticipated people working in L2 to more quickly deplete their networks of habitual knowledge as they would have more limited semantic networks to articulate the information. They would therefore be forced to seek beyond the usual, which would lead them toward ideating more original answers.

However, H2 can neither be confirmed nor denied as I found no statistically significant evidence ($p>0.05$) suggesting a difference between the groups generating ideas in L1 (AVG of all answers: $M=4.95$; $SD=0.53$; AVG of top 2 answers: $M=7.2$; $SD=0.91$) and the groups generating ideas in L2 (AVG of all answers: $M=4.99$; $SD=0.40$; AVG of top 2 answers: $M=7.1$; $SD=0.98$) (see figure 6 and 7). Thus, at this time, I cannot reject that working in L2 had no impact on originality.

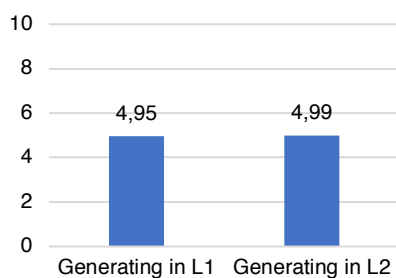


Figure 7: Average creativity of all answers generated during the 10 minutes creative ideation task.

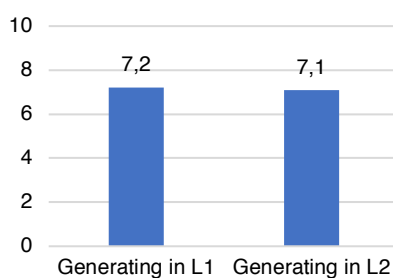


Figure 6: Average creativity of the Top 2 answers generated during the 10 minutes creative ideation task.

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H3: Working in a secondary language improves expansivity

My third hypothesis posited that I expected working in a secondary language to improve expansivity. In other words, because I thought participants ideating in L2 would more quickly deplete their networks of habitual thinking (more limited semantic networks to articulate the information), I foreseen them to be able to generate more expansive ideas and exit the fixation effect (ideas outside the three common categories: damping the shock, protecting the egg, and slowing the fall). Exhausting more rapidly the bank of habitual thinking would push them toward exploring ideas belonging to expansive categories of ideas.

Results suggests that additional research, especially with a sample considerably larger than the 30 participants used in this study, is needed to confirm or deny this hypothesis as there is evidence reaching a statistical meaningfulness of $p=0.09$. While being clearly aware that this falls short of the $p=0.05$ cut-off for significance, I think it indicates that there is a trend deserving further investigation with a larger sample in order to find more certain and unambiguous results.

Participants performing the task in L2 generated fewer expansive answers outside the fixation effect, 3.93 ideas on average ($SD=3.45$), compared with the participants performing the task in L1, 5.47 ideas on average ($SD=2.64$) (see figure 8). It would be highly valuable to examine if these results could reach statistical significance with the use of a larger sample than the one used in this study. There is room for further investigation.

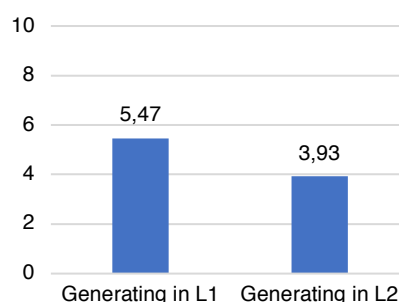


Figure 8: Average number of expansive ideas generated during the 10 minutes creative ideation task.

H4: Working in a secondary language improves flexibility

My fourth hypothesis posited that I expected working in a secondary language to improve flexibility. Due to more limited semantic networks, lowering the ability to articulate the information in the networks of knowledge, which might also

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suffer from less interconnectedness between the nodes and clusters of concepts, I postulated that participants ideating in L2 would be forced to move more between unique conceptual categories as they would be less able to remain in one and generate multiple derivative answers as the clusters of related concepts would be smaller.

However, H4 can neither be confirmed nor denied as I found no statistically significant evidence ($p>0.05$) suggesting a difference between participants generating ideas in L1 ($M=11.2$; $SD=3.61$) and participants generating ideas in L2 ($M=9.6$; $SD=3.52$) regarding the number of unique conceptual categories produced (see figure 9). Thus, at this time, I cannot reject that working in L2 had no impact on flexibility.

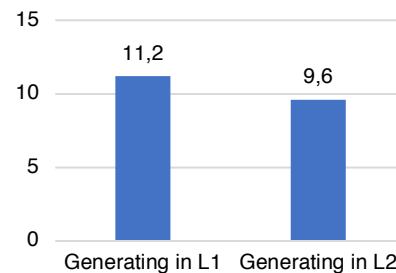


Figure 9: Average number of unique conceptual categories generating during the 10 minutes creative ideation task.

H5: Working in a secondary language diminishes fixation

My fifth hypothesis posited that I expected working in a secondary language to weaken the fixation effect³⁸. Based on H1 and H3, due to more limited semantic networks, lowering the ability to articulate the information in the networks of knowledge, I expected participants ideating in L2 to exhibit less fluency overall, but to produce a higher number of expansive answers by being pushed toward original concepts and remote clusters of ideas. This would have meant a lowering of the fixation effect. Indeed, I anticipated participants to generate fewer answers globally, but to observe a larger proportion of expansive ideas deemed *very original*.

However, H5 can neither be confirmed nor denied as I found no statistically significant evidence ($p>0.05$) suggesting a difference in fixation between the group generating ideas in L1 and the group generating ideas in L2. Thus, at this time, I cannot reject that working in L2 had no impact on fixation.

³⁸ The fixation effect is when spontaneously activated type of reasoning occurs during the execution of a creative ideation tasks and it blocks further exploration (Purcell & Gero, 1996; Agogu e et al., 2015).

6 DISCUSSION

The primary result of this study is that working in a secondary language decreased fluency. People ideating in their L2, even the highly proficient ones, produced fewer ideas: 11.9 answers on average for participant performing the task in L2 compared with 15 for participants performing the task in L1. Based on the literature on brainstorming and idea generation, this phenomenon is counterproductive as *quantity yields quality* (Rietzschel, Nijstad & Strobe, 2007). The results also showed compelling, though still ambiguous, trends indicating that working in L2 might have been harmful for expansivity. This means that in addition to fewer answers generated, people working in L2 also produced fewer expansive/very original ideas. In this section, I will discuss creativity and innovation management and what does these results implies for organizations. What can organizations and managers do in terms of practices to positively leverage the power of bilingualism. This will lead me into presenting future paths of research. Lastly, I will reflect on the limits of this study and on the importance of research and knowledge to occur in multiple languages.

Language is historically, socially, and culturally rooted. Language is also a creative process as it evolves, adapts, and innovates when being used to express the speakers' world. Some scholars contextualized creativity in an analogous way. Amabile (1996. As cited in Shalley & Gilson, 2004) considered creativity to be historically, culturally, and socially bound. It makes the bond between language and creativity remarkably fascinating.

As I mentioned previously, the discourses about originality and creativity in organizations are positive. Interviews showed Managers and CEOs saying that they want creative people³⁹. Machines are handling the numbers and the data, so it really is about who can most creatively utilize comparable outputs from similar machines. However, oftentimes all this talk regarding the desirability of

³⁹ In a recent interview with Bloomberg TV ("Mark Cuban says this skill will be critical in 10 years, and Elon Musk agrees", 2018), Mark Cuban said that the most important skill to have in the next ten years will be the ability to think creatively, and Elon Musk expressed similar opinions.

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creativity does not align with practices and actions as these same managers and CEOs do not seem to like the disruption brought on by creative people who are question the status quo and established paradigms. “The emphasis on compliance takes priority over creativity and innovation” (Amar, 1998). Creativity is undermined constantly, often unintentionally, daily in organizations and work environments that were essentially created to maximize business imperatives such as coordination, productivity, and control (Amabile, 1998). As asserted by Martins and Terblanche (2003):

“The problem is that many organisations hope that personnel will think more creatively and take risks, but they are rewarded for well-proven, trusted methods and fault-free work. Personnel should also be rewarded for risk taking, experimenting and generating ideas.”
(p.71)

Regularly, managers seem to believe that creativity solely belongs to marketing and R&D (Amabile, 1998). This is shocking as individual creativity is the foundation necessary to build originality and innovation in organizations, which is critical to their survival, increasingly so today (Amabile, 1988; Nystrom, 1990). Even in business schools, students are hammered with concepts of creativity, innovation, and divergent and critical thinking, but the way they are evaluated is rarely, if ever, designed to account for it⁴⁰. Students are mostly rewarded for giving accurate answers that reflect exactly what was taught and presented in the readings and lectures. Yet, they are still expected to learn about being innovative since it will be an important skill for their careers (Moos, 2015). Taking a creative approach to an assignment becomes a funambulist exercise where the risk of falling is high, and the net is nowhere to be seen.

Returning to the notion of language, some research showed that learning through a secondary language that is not always well mastered can be an excellent strategy toward *stupidification* (Brock-Utne, 2007). This *stupidification* slows down the learning process and can make participant quieter, more passive, less

⁴⁰ A previous project conducted on this subject included interviews with HEC Montreal professors. The conclusion was overwhelmingly that business schools do not truly value critical thinking in students' evaluation.

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expansive when expressing their ideas, as well as less likely to build on or critique ideas expressed by others. These studies were conducted in classroom settings, but they share processes quite alike those used in meetings and brainstorming sessions. The listed consequences of *stupidification* are elements that would be of interest moving forward after this thesis. They would be elements to observe in brainstorming sessions and meetings in organizational settings. If it holds true, maybe at a more nuanced degree, it would mean that by forcing themselves, or being forced, to limit their verbal ideation to their secondary language to suit the environment they are in, people would give up on fluency, on taking an increasingly active role in the discussions and debates, on being more critical, and on being comfortable and expansive about what they are trying to say. Fluency of expression, speech fluency, ideational fluency, and word fluency or preeminent factors of creativity (Carrol, 1985. As cited in Woodman, Sawyer & Griffin, 1993). A significant loss of fluency is the predominant result of this research project. This is alarming.

Expertise is the *network of possible wanderings* (Newell & Simon, 1972) and being limited to L2 is lessening this network. By creating an environment that is truly fostering inclusion and use of someone's complete expertise, managers could *expand the wanderings*. I, someone who works continuously in both languages, would feel utterly limited by being forced to choose only one. Teresa Amabile (1998; see figure 10) postulated that for organizations, expertise and creative-thinking skills are more time consuming and difficult to influence than motivation. However, language is an expertise that is already present and that contributes to creative thinking skills. The only thing managers must do is let people use it. There is an impression that a conversation or a meeting should happen in a single language; it sounds more even and euphonic. But, especially when focused on the English/French dyad, there is always someone who will be able to do a quick translation for people not understanding fully. It is a lesser trade-off than losing expansivity and ideation fluency from people trying to limit themselves to their L2. Simultaneously, that valuing of their identity could act as

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a boost to their intrinsic motivation as intrinsic motivation is related to, among other things, feelings of competence (Amabile, 1988; Amabile, 1998; Shalley & Gilson, 2004). Intrinsic motivation is often seen as crucial for creativity; it fosters it (Amabile, 1979; Amabile & Gryskiewicz, 1987; Amabile, Goldfarb & Brackfield, 1990). As asserted by Amabile (1998), work-group features that bolster creativity involve diversity of perspectives and backgrounds, and mutual support. There is a need to recognize the unique knowledge and viewpoints brought to the table by each.

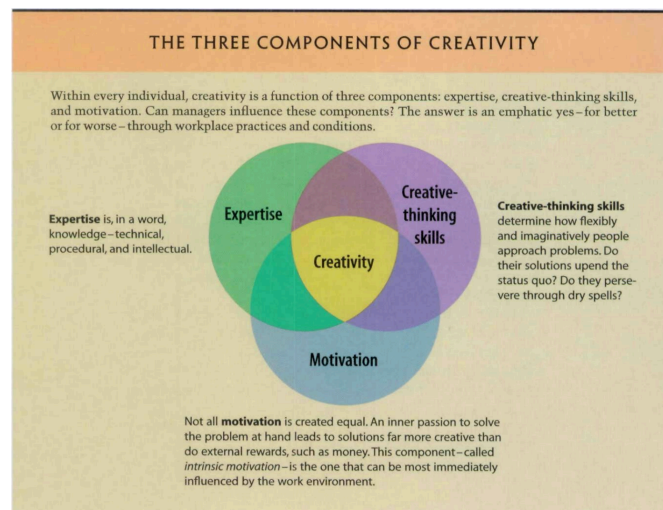


Figure 10: The three components of creativity (Amabile, 1998)

Particularly when discussing organizational environments, creativity occurs in a specific context, and this context plays a crucial role in the success of creativity through capabilities, pressures, resources, and sociotechnical system surrounding the employees (Csikszentmihalyi, 1999). Organizational processes, procedures, and systems are vital contributors to strengthen individual creativity (Amabile, 1998). For example, Cummings and Oldham (1997) discovered that people with creative personalities only created more innovative work than those with less creative personalities when they were surrounded by an organizational context favourable to creativity. Relatedly, not feeling free to use languages fully is not enabling creativity and would be considered a hindrance.

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Leadership practices must be adapted to allow people to work in both their L1 and L2 and alternate instead of fully adopt L2. There is an implicit pressure to switch to English as soon as a single anglophone element appears for French Canadians are expected to be bilingual. Brainstorming sessions need to be framed in such a way that a person could move back and forth between two languages. Leadership needs to play a key role here as people might be able to perform in both languages, but if they do not perceive that it is appropriate the managers would have to set an example to demonstrate or at least establish a clear norm that the behaviour is acceptable (Bandura, 1986; Amabile, 1998).

If creativity loaths strong conformity as it appears to do, then it would make sense to assume that group norms forcing strong conformity would also be anathema to creativity, such as a single language norm (Amabile; 1988, Kanter; 1988, Woodman, Sawyer & Griffin, 1990). Norms or a by-product of organizational culture and climate, which are primarily set by the leaders, and as noted by Reichers and Schneider (1990. As cited in Tesluk, Farr & Klein, 1997):

“Both climate and culture deal with the ways by which organization members make sense of their environment. These sense-making attempts manifest themselves as shared meanings that form the basis for action. Both climate and culture are learned, largely through the socialization process and through symbolic interaction among group members.” (p. 29)

According to the feedback received from the people ideating in English in this study, they would have appreciated the opportunity to alternate between both their L1 and L2⁴¹. The reason is not that they are not bilingual enough, but simply that they *are* bilingual, meaning they use both languages, and one is not the perfect replica of the other. Some answers were left unsaid because they emerged in French and they felt unable to appropriately express them in English; the knowledge was there but not the semantic to articulate it. Some ideas can also possess a strong semiotic meaning that is not directly translatable.

⁴¹ As indicated by the post-creative ideation task questions, most participant ideating in L2 engaged in translation at least some times over the 10 minutes period.

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Creativity relevant skills such as the ability to think creatively, generate alternatives, engage in divergent thinking, and suspend judgment would be enhanced, especially the first three, by having the opportunity to use the full potential of bilingualism (Amabile, 1988; Shalley & Gillson, 2004). Being bilingual is not just about speaking a secondary language, but rather about mastering two that both contributes to the cognitive skills, networks of knowledge, and semantic networks,. Certain domain-specific knowledge may exist in a single language because it developed in a particular context, and a person would have to be able to work in that language, at least momentarily, to retrieve information (Gardner, 1993, 2011). More fields of knowledge and more cues are accessed, and more varied information is retrieved, which can lead to more novel alternatives and expansivity. For instance, I consider myself quite perfectly bilingual, but speaking for 20 minutes about my expertise concerning French literature of the 18th century solely in English would be painful at first. It is a domain-specific knowledge that has yet to be useful in my life's most anglophone sphere. I have never had to discuss the subject at length in English yet. To be able to express myself on the subject properly, I would possibly have to express some notions in French and then self-translate and rephrase them. It seems like an odd example when discussing organizational environments, but if we look at publicity, advertising, marketing, and other creative industries, a broad range of subjects can serve as inspiration or emerge in a brainstorming session for a campaign, a project, or a product. In these cases, domain specific knowledge from numerous fields could emerge and, as would be my case with French literature, some people might have never discussed these in their L2. The point being that having the opportunity to revert to a first language and then self-translate or have someone in the meeting help is more enriching for the creative process than trying to force something and then give up on trying once the idea is not emerging correctly.

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There is a need for more open environments, especially in Montreal, where switching from one language to another is allowed and valued⁴². There is always someone in the room able to translate anyways. These settings require leaders who will set the tone because they believe in it, and because it will bring value to the organizations. Montreal is a renown creativity hub, and bilingualism is always cited as one of the key factors. It is also an intangible competitive advantage, and it is not possible to replicate a bilingual environment such as Montreal. Let's use this advantage and let's speak our creativity to maximize quantity and quality.

Future research paths I want to pursue involve gathering data on the ground by going inside the organizations. The purpose would be to interview employees and managers regarding practices and their experiences. I also want to collect data ethnographically by observing brainstorming sessions and meetings; there is great richness there. Continuing with controlled experiments, I am deeply committed to working with larger samples that are more representative of the population in order to obtain results⁴³ that are generalizable. The focus of this thesis was quite narrow and I want to enlarge it to make it more inclusive of varied experiences. I desire to go beyond the French/English dyad to observe bilingualism from more global and varied vantage points⁴⁴. This thesis is just the beginning of what I hope will become a compelling body of work contributing to the understanding of the reality of working in a secondary language and to the management of creativity and innovation. Quebec remains a fascinating and fertile case study to examine this reality.

⁴² I think there is the impression that having to revert to a first language to retrieve an information signals that a person is not proficient enough in L2. I think this pressure originates from both the individual, who want to be perceived as competent, and from the people listening. I believe this rationale is erroneous.

⁴³ For instance, the results of this study showed a trend that working in L2 is detrimental to expansivity, but at the moment it is still very tangential. With a bigger sample, I would be able to obtain a clearer picture with more certain results (either confirming or infirming).

⁴⁴ For instance, looking at bilingual anglophones would bring a different perspective. Moreover, in Quebec, there are people whose first language is neither French nor English, but who had to adopt one of them as their primary work language. These are just a few examples.

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The importance of a metalinguistic discourse

Metalinguistic is a properly human phenomenon as we are the only specie discussing and arguing over language (Jakobson, 1963). Indeed, there is a more macro-level discourse to be had here regarding languages and bilingualism in the context of learning and working. There is a pressure for business dealings to occur in English. There is a similar pressure for academic communications on the global stages, and in education per se. (Brock-Utne, 2001). Brock-Utne (2001) mentioned that in Nordic universities, they are now almost unable to have students read texts in German and French (two languages that were prominent secondary languages), which was not a problem a generation ago. There is a proclivity to select, first and foremost, English texts when building syllabus. English has taken over as the language of academia, and of most of higher education. This phenomenon of electing a *lingua franca* is dangerous because it means that slowly other languages will stagnate in their capacity to express some types of knowledge (Brock-Utne, 2001, Bouchard, 2013, 2015). For instance, if French is never used in some domains, it will gradually and naturally become unable to express certain realities. In a chomskyan perspective, the language is rich because it is constantly created while being used. Neologisms and such are continuously emerging to express new realities and innovative technologies. However, to have equivalencies in all languages, research work and creation must happen in all languages. Going back to a former example, people cannot know that a light switch is actually named an *interrupteur* in their L1 if nobody uses the term. Accordingly, before the language planning and legislations in Quebec, francophones were rendered unable to fully express their reality in their own home. Naming is dominating (Gusdorf, 1979). If people lose their ability to express what they want in their mother tongue, they lose part of their identity and they end up in a subservient position. In these extreme cases, bilingualism becomes subtractive in the sense that the secondary language takes over and ends up becoming more suited to express one's reality, not because it is intrinsically more apt at doing so, but rather because the first language was not given the

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opportunity to adapt and evolve. The first language becomes impoverished in its ability to fully express the speaker's world (Landry, 1982; Leclerc, 2010). Let's ensure that creation and innovation is multilingual moving forward. Knowledge should be universal and not language specific.

7 CONCLUSION

The sociolinguistic history of Quebec is rich and fascinating. Over the course of over 400 years, language has been a source of fierce debates surrounding identity, culture, and power relations. There is a long history of linguistic insecurity contributing to Quebec being a diglossic society where the local vernacular French has been perceived as inferior to the standard France's French and to English, the North American *lingua franca*. Today, bilingualism thrives in Quebec, and the new generation tends to see language as a playing field more so than as a battlefield. The feeling of attempted assimilation has subdued, and the dread of linguistic jeopardy is more the results of isolated events⁴⁵ than a constant state. This coexistence of English and French has made Montreal a prime exemplar of a true bilingual environment. This bilingualism is a strength and is often heralded as a key driver behind the growing international recognition of Quebec as a creativity and innovation hub.

Nevertheless, bilingualism in Montreal continues to be unidirectional as French-speaking Quebecois.es are the ones expected to be proficient in English. The lasting linguistic insecurity seems to reinforce this tendency of Quebecois.es to accommodate and transition to English promptly when they are with someone who is more comfortable in this language. This appears to hold true in work environments as well (e.g. meetings, brainstorming sessions, etc.)⁴⁶. There is a

⁴⁵ For instance, when the manager of the Montreal Adidas store mentioned that he would *accommodate* francophone media by saying a few words in French in the Fall of 2017. These are the kind of events that spark outrage considering the history and language planning required to save French in the 1960s and 1970s. It is also blatantly disrespectful and somewhat brings back to the time of *Speak White*.

⁴⁶ This is based on my experiences and those of many of my friends and colleagues. Even if it is someone we work with, and not a client, who is more comfortable in English we tend to accommodate that person and resort to English when communicating with him or her.

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minority mentality at play. Even though French Canadians are a majority in Quebec, there is a deep-rooted notion that business, even in Montreal, is very anglophone, that *big business* occurs in English. This reflects on work behaviors where, as a result of creating deliverables in English, a lot of the interactions also unfold in English. It permeates.

The outcome is that Quebecois.es often work in English, their L2. While moving back and forth between French and English does not sound like a problem, most meetings and brainstorming sessions seem to be conducted in one language and there is a pressure to conform and maintain the euphony.

While the literature on bilingualism and creative cognitions emphasizes a positive relationship, there is a lack of research conducted on creative ideation in a secondary language. The cognitions of bilinguals and multilinguals may be more original, but the effects of expressing these in L2 remain ambiguous. I saw this gap in the literature as an opportunity for this thesis and articulated the following research question: *What are the impacts of working in a secondary language on creativity?*

I explored literatures on creativity, idea generation and brainstorming, and linguistic to build conceptual foundations and theorize. The goal was to gather research that would help comprehend how creativity is articulated in L2.

Creativity is an ability to find novel and fresh ways of doing things and rejuvenate processes. It is measured based on fluency, originality, flexibility, and expansivity. While a desirable aptitude, being creative is challenging as the path of least resistance and the network of habitual thoughts usually direct people toward ideas that are tried-and-true rather than original and unusual. They fall victim to the fixation effect.

Idea generation and brainstorming theories clarified how creative ideas emerge. Numerous studies asserted that *quantity yields quality*; the more ideas are produced the greater the chance of a novel one. However, it is hard to get to these creative solutions. Oftentimes, people are trapped in the network of habitual thinking, the information that is used often and the concepts that are closely

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associated with them. When generating ideas, it is usually after these clusters of common knowledge are entirely depleted that people can dive and explore remote territories of the networks of knowledge where original ideas reside. Thus the focus on quantity. People need to get those ubiquitous notions out of the way, and brainstorming is a good method to achieve that.

The concept of network is also present in linguistic. Indeed, the nodes and concepts in these networks of knowledge are embedded in semantic networks that allow to describe all the possible realities. To generate ideas and verbalize them, people need a vocabulary. People's ability to *speak their creativity* is directly related to their lexicon. More linguistic categories lead to more cognitive categories. Linguistic relativity is exactly that: people's language influence how they see the world and how they can *say* their world. However when it comes to bilingualism, the semantic networks in language B might not be identical to the semantic network in language A, and this can have important effects on ideation when trying to articulate knowledge in a secondary language. The knowledge might be there, but not the words necessary to articulate it in L2 as it was acquired with the semantic of L1.

These three blocks of literature provided foundations to answer the research question. I postulated the following hypothesis:

- H1: Working in a secondary language diminishes fluency
- H2: Working in a secondary language improves originality
- H3: Working in a secondary language improves expansivity
- H4: Working in a secondary language improves flexibility
- H5: Working in a secondary language diminishes fixation

I designed an experimental protocol to gain insights into the causality between language (independent variable) and creativity (dependent variable) and to try to answer the hypotheses. The experimental protocol consisted of two surveys and a creative ideation task. 30 participants were recruited. They were francophone-bilingual graduate students and young professionals in creative fields. The control condition's group performed the creative ideation task in French, while the experimental condition's group performed the task in English.

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The main finding was striking: a statistically significant evidence that working in L2 had a strong negative impact on fluency, which allowed me to confirm H1. On average, participants performing the task in English generated 11.9 answers compared with 15 answers for participants performing the task in French. Fluency being a key indicator of creativity, this result is consequential. I was not able to confirm the other four hypotheses at this time. However, results showed trend signaling that working in L2 had a detrimental effect on expansivity. While not statistically significant at this time, it would be a path worth investigating with a much larger sample to obtain a clearer picture.

I intend to take time to reflect on the lessons learned and improve the experimental protocol as well as combine it with other methods to gather richer data that will be grounded in the organizational environments. Interviews and ethnographic observations of meetings and brainstorming sessions would be powerful to supplement the experimental data. This study was a first step toward what I hope will become a compelling body of work that will contribute to a emerging field of research.

Creativity and innovation are important strategic levers for organizations. If a felt pressure to conform to a single language during meetings is detrimental, then there is a crucial need for a conversation on leadership and management practices. The small number of existing research on the subject contributed to my belief that very few people are actually cognizant of the issues brought forward in this thesis, but they are genuine and consequential. It is necessary to shed light upon these issues affecting several individuals. Leaders need to establish norms of inclusion. By valorizing bilingualism as the ability to speak two languages rather than as the ability to speak English, there would be a recognition of someone's identity and expertise. This could lead to heightened intrinsic motivation. The literature is unambiguous regarding the discrepancy between the positive discourses of managers saying they want creative people and the actual practices instigated to support these creative people. They do not often align. It is time for leaders to walk the talk.

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9 APPENDICES

9.1 APPENDIX 1: THE FIVE-FACTOR MODEL OF PERSONALITY

Traits	Definition	
Openness to experience	The extent to which a person thinks flexibly and is receptive to new ideas. More open people tend toward creativity and innovation. Less open people favour the status quo. People who are high on openness to experience are likely to do well in jobs that involve learning and creativity given that they tend to be intellectual, curious, and imaginative and have broad interests.	Curious, Original vs. Dull, Unimaginative
Conscientiousness	The degree to which a person is responsible and achievement-oriented. More conscientious people are dependable and positively motivated. They are orderly, self-disciplined, hard-working, and achievement-striving, while less conscientious people are irresponsible, lazy, and impulsive. Persons who are high on conscientiousness are likely to perform well on most jobs given their tendency towards hard work on achievement.	Dependable, Responsible vs. Careless, impulsive
Extraversion	This is the extent to which a person is outgoing versus shy. Persons who score high on extraversion tend to be sociable, outgoing, energetic, joyful, and assertive. High extraverts enjoy social situations, while those low on this dimension (introverts) avoid them. Extraversion is especially important for jobs that require a lot of interpersonal interaction, such as sales and management, where being sociable, assertive, energetic, and ambitious is important for success.	Sociable, Talkative vs. Withdrawn, shy
Agreeableness	The extent to which a person is friendly and approachable. More agreeable people are warm, considerate, altruistic, friendly, sympathetic, cooperative, and eager to help others. Less agreeable people tend to be cold and aloof. They tend to be more argumentative, inflexible, uncooperative, uncaring, intolerant, and disagreeable. Agreeableness is most likely to contribute to job performance in jobs that require interaction and involve helping, cooperating, and nurturing others, as well as in jobs that involve teamwork and cooperation.	Tolerant, Cooperative vs. Cold, Rude
Neuroticisms	The degree to which a person has appropriate emotional control. People with high emotional stability (low neuroticism) are self-confident and have high self-esteem. Those with lower emotional stability (high neuroticism) tend toward self-doubt and depression. They tend to be anxious, hostile, impulsive, depressed, insecure, and more prone to stress. As a result, for almost any job the performance of persons with low emotional stability is likely to suffer. Persons who score high on emotional stability are likely to have more effective interactions with co-workers and customers because they tend to be more calm and secure.	Stable, Confident vs. Depressed, Anxious

Source: Johns & Saks, 2010

Retrait d'une ou des pages pouvant contenir des renseignements personnels

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SECTION 1 :

Âge : _____

Sexe :

- Homme
 Femme
 Autre

Occupation (inclure spécifiquement le ou les domaines, et le niveau universitaire si vous êtes étudiant(e)) :

1. Veuillez lister toutes les langues que vous maîtrisez en ordre de dominance.

1.	2.	3.	4.	5.
-----------	-----------	-----------	-----------	-----------

2. Veuillez lister toutes les langues que vous maîtrisez en ordre d'acquisition (votre langue maternelle en premier).

1.	2.	3.	4.	5.
-----------	-----------	-----------	-----------	-----------

3. Veuillez lister le pourcentage du temps, en moyenne et dans votre environnement actuel, auquel vous êtes exposé à chaque langue (*votre pourcentage devrait totaliser 100%*).

Langues					
% du temps					

4. Au moment de choisir un texte à lire qui est disponible dans toutes les langues que vous maîtrisez, dans quel pourcentage des cas allez-vous choisir de lire ce texte dans les différentes langues que vous maîtrisez? Veuillez assumer que le texte original a été écrit dans une langue que vous ne connaissez pas.

Langues					
% du temps					

5. Au moment de choisir une langue pour parler avec une personne qui est aussi compétente que vous dans toutes les langues que vous maîtrisez, dans quel pourcentage du temps allez-vous choisir l'une ou l'autre des langues que vous maîtrisez? S'il-vous-plait, rapporter un pourcentage du temps total. (*votre pourcentage devrait totaliser 100%*).

Langues					
% du temps					

6. Veuillez nommer les cultures avec lesquelles vous vous identifiez. Sur une échelle de zéro à dix, veuillez indiquer l'ampleur de votre identification avec chaque culture nommée. (e.g. Québécois, Canadien, Français, Catholique, Chrétien, Juif, Africain-Américain, etc.)

Cultures					
Identification					

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7. Combien d'années d'éducation formelle avez-vous complété? _____
(*Veillez sélectionner votre niveau d'études le plus avancé*)
- Moins que le secondaire / bac français
 - Secondaire / bac français
 - Certification professionnelle
 - Un peu d'études universitaires
 - Diplôme d'études universitaires
 - Un peu d'études de cycles supérieurs
 - Maîtrise
 - Doctorat
8. Date d'immigration au Canada/Arrivée au Québec, si applicable : _____
Si vous avez déjà immigré dans un autre pays, veuillez fournir le nom du pays et la date d'immigration ci-dessous :
9. Avez-vous déjà eu des problèmes de vision _____, un déficit auditif _____, un déficit langagier _____, des difficultés d'apprentissage _____ ? (Cocher le/les choix applicable(s)). Si vous avez coché un ou plusieurs choix, veuillez expliquer (incluant toute(s) forme(s) de correctif) :
-

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SECTION 2:

Langue 1 (langue maternelle) : _____

1. À quel âge...

Avez commencé à apprendre :	Avez commencé à parler couramment :	Avez commencé à lire :	Avez commencé à lire couramment :

2. Veuillez lister le nombre d'années et de mois que vous avez passé dans chaque environnement langagier :

	Année(s)	Mois
Un pays où LANGUE 1 est parlée		
Une famille où LANGUE 1 est parlée		
Une école et/ou environnement de travail où LANGUE 1 est parlée		

3. Sur une échelle de zéro à dix veuillez indiquer votre niveau de compétence pour parler, comprendre, et lire LANGUE 1.

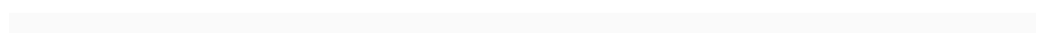
Parler		Comprendre		Lire	
--------	--	------------	--	------	--

4. Sur une échelle de zéro à dix, veuillez indiquer l'importance des facteurs suivant dans votre apprentissage de LANGUE 1 :

Interaction avec des amis		Outils d'autoapprentissage (e.g. CD)	
Interaction avec la famille		Regarder la télévision	
Lecture		Écouter la radio / musique	

5. Sur une échelle de zéro à dix, veuillez indiquer le niveau auquel vous êtes présentement exposé à LANGUE 1 dans les contextes suivants :

Interaction avec des amis		Écouter la radio / musique	
Lecture		Interaction avec la famille	
Regarder la télévision		Outils d'autoapprentissage (e.g. CD)	



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Langue 2 (* We included pages for up to language 3, 4, and 5) _____

1. À quel âge...

Avez commencé à apprendre :	Avez commencé à parler couramment :	Avez commencé à lire :	Avez commencé à lire couramment :

2. Veuillez lister le nombre d'années et de mois que vous avez passé dans chaque environnement langagier :

	Année(s)	Mois
Un pays où LANGUE 2 est parlée		
Une famille où LANGUE 2 est parlée		
Une école et/ou environnement de travail où LANGUE 2 est parlée		

3. Sur une échelle de zéro à dix veuillez indiquer votre niveau de compétence pour parler, comprendre, et lire LANGUE 2.

Parler		Comprendre		Lire	
--------	--	------------	--	------	--

4. Sur une échelle de zéro à dix, veuillez indiquer l'importance des facteurs suivant dans votre apprentissage de LANGUE 2 :

Interaction avec des amis		Outils d'autoapprentissage (e.g. CD)	
Interaction avec la famille		Regarder la télévision	
Lecture		Écouter la radio	

5. Sur une échelle de zéro à dix, veuillez indiquer le niveau auquel vous êtes présentement exposé à LANGUE 2 dans les contextes suivants :

Interaction avec des amis		Écouter la radio / musique	
Lecture		Interaction avec la famille	
Regarder la télévision		Outils d'autoapprentissage (e.g. CD)	

6. Selon vous, sur une échelle de zéro à dix, quel est l'ampleur de l'accent étranger que vous avez lorsque vous vous exprimez dans LANGUE 2?

0 1 2 3 4 5 6 7 8 9 10

7. Sur une échelle de zéro à dix, veuillez indiquer à quelle fréquence vous êtes identifié par vos interlocuteurs comment étant un locuteur NON-natif de LANGUE 2.

0 1 2 3 4 5 6 7 8 9 10

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SECTION 3

En tant qu'étudiant(e) membre d'un projet de recherche ou jeune professionnel(le) œuvrant au sein d'une organisation :

1. Je vais suggérer de nouvelles approches pour atteindre les objectifs/buts. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

2. Je vais développer des approches novatrices et pratiques pour améliorer les performances. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

3. Je vais tenter de trouver de nouveaux processus, technologies, techniques, et/ou idées de produits. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

4. Je vais suggérer de nouvelles approches pour améliorer la qualité. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

5. Je suis une bonne source d'idées créatives. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

6. J'aime prendre des risques. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

7. Je vais promouvoir et défendre les idées des autres. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

8. Je vais démontrer de la créativité dans mon travail lorsque j'en ai l'opportunité. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

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9. Je vais développer un plan et un échéancier adéquats pour la mise en place d'idées nouvelles. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

10. J'ai souvent des idées nouvelles et novatrices. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

11. Je vais trouver des solutions créatives aux problèmes. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

12. J'ai souvent une perspective nouvelle face aux problèmes. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

13. Je vais suggérer de nouvelles manières d'exécuter les tâches. (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

14. Je suis une personne créative (1 = Pas du tout d'accord ; 6 = Tout à fait d'accord)

1 2 3 4 5 6

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SECTION 4 :

	S.V.P. Évaluez les items suivants selon une échelle de 1 à 5. 1-tout à fait en désaccord, 2-en désaccord, 3-neutre/indifférent(e), 4-en accord, 5-tout à fait en accord. Répondez rapidement sans trop réfléchir. S.V.P., assurez-vous d'avoir répondu à toutes les questions.					
1	Je suis un boute-en-train	1	2	3	4	5
2	Je compatis avec les sentiments des autres	1	2	3	4	5
3	Je fais les corvées tout de suite	1	2	3	4	5
4	J'ai de fréquents sauts d'humeur	1	2	3	4	5
5	J'ai une imagination vive	1	2	3	4	5
6	Je ne parle pas beaucoup	1	2	3	4	5
7	Je ne suis pas intéressé par les problèmes des autres	1	2	3	4	5
8	J'oublie souvent de remettre les choses à leur place	1	2	3	4	5
9	Je suis détendu la plupart du temps	1	2	3	4	5
10	Je ne suis pas intéressé par les idées abstraites	1	2	3	4	5
11	Je parle à beaucoup de personnes différentes lors d'une soirée	1	2	3	4	5
12	Je ressens les émotions des autres	1	2	3	4	5
13	J'aime l'ordre	1	2	3	4	5
14	Je deviens choqué rapidement	1	2	3	4	5
15	J'ai de la difficulté à comprendre les idées abstraites	1	2	3	4	5
16	Je me tiens à l'écart	1	2	3	4	5
17	Je ne suis pas vraiment intéressé par les autres	1	2	3	4	5
18	Je mets le désordre	1	2	3	4	5
19	Je me sens rarement triste	1	2	3	4	5
20	Je n'ai pas une bonne imagination	1	2	3	4	5

Section 5 :

Je connais la tâche de créativité de l'œuf?

- Oui
- Non
- Incertain

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9.3 APPENDIX 3: LANGUAGE EXPERIENCE AND PROFICIENCY QUESTIONNAIRE

Last Name		First Name	Today's Date
Age		Date of Birth	Male <input type="checkbox"/> Female <input type="checkbox"/>

(1) Please list all the languages you know **in order of dominance**:

1	2	3	4	5
---	---	---	---	---

(2) Please list all the languages you know **in order of acquisition** (your native language first):

1	2	3	4	5
---	---	---	---	---

(3) Please list what percentage of the time you are *currently* and *on average* exposed to each language.

(Your percentages should add up to 100%):

List language here:				
List percentage here:				

(4) When choosing to read a text available in all your languages, in what percentage of cases would you choose to read it in each of your languages? Assume that the original was written in another language, which is unknown to you.

(Your percentages should add up to 100%):

List language here				
List percentage here:				

(5) When choosing a language to speak with a person who is equally fluent in all your languages, what percentage of time would you choose to speak each language? Please report percent of total time.

(Your percentages should add up to 100%):

List language here				
List percentage here:				

(6) Please name the cultures with which you identify. On a scale from zero to ten, please rate the extent to which you identify with each culture. (Examples of possible cultures include US-American, Chinese, Jewish-Orthodox, etc):

List cultures here				
	(click here for scale)	(click here for scale)	(click here for scale)	(click here for scale)

(7) How many years of formal education do you have? _____

Please check your highest education level (or the approximate US equivalent to a degree obtained in another country):

- | | | |
|--|---|--|
| <input type="checkbox"/> Less than High School | <input type="checkbox"/> Some College | <input type="checkbox"/> Masters |
| <input type="checkbox"/> High School | <input type="checkbox"/> College | <input type="checkbox"/> Ph.D./M.D./J.D. |
| <input type="checkbox"/> Professional Training | <input type="checkbox"/> Some Graduate School | <input type="checkbox"/> Other: |

(8) Date of immigration to the USA, if applicable _____

If you have ever immigrated to another country, please provide name of country and date of immigration here.

(9) Have you ever had a vision problem , hearing impairment , language disability , or learning disability ? (Check all applicable). If yes, please explain (including any corrections):

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Language:

This is my (please select from pull-down menu) language.

All questions below refer to your knowledge of .

(1) Age when you...:

<i>began acquiring</i> :	<i>became fluent</i> in :	<i>began reading</i> in :	<i>became fluent reading</i> in :

(2) Please list the number of years and months you spent in each language environment:

	Years	Months
A country where is spoken		
A family where is spoken		
A school and/or working environment where is spoken		

(3) On a scale from zero to ten, please select your *level of proficiency* in speaking, understanding, and reading from the scroll-down menus:

Speaking	(click here for scale)	Understanding spoken language	(click here for scale)	Reading	(click here for scale)
----------	------------------------	-------------------------------	------------------------	---------	------------------------

(4) On a scale from zero to ten, please select how much the following factors contributed to you learning :

Interacting with friends	(click here for pull-down scale)	Language tapes/self instruction	(click here for pull-down scale)
Interacting with family	(click here for pull-down scale)	Watching TV	(click here for pull-down scale)
Reading	(click here for pull-down scale)	Listening to the radio	(click here for pull-down scale)

(5) Please rate to what extent you are currently exposed to in the following contexts:

Interacting with friends	(click here for pull-down scale)	Listening to radio/music	(click here for pull-down scale)
Interacting with family	(click here for pull-down scale)	Reading	(click here for pull-down scale)
Watching TV	(click here for pull-down scale)	Language-lab/self-instruction	(click here for pull-down scale)

(6) In your perception, how much of a foreign accent do you have in ?

(click here for pull-down scale)

(7) Please rate how frequently others identify you as a non-native speaker based on your accent in :

(click here for pull-down scale)

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9.4 APPENDIX 4: SELF-ASSESSED CREATIVITY SCALE

1. I will suggest new ways to achieve goals or objectives.
2. I will come up with new and practical ideas to improve performance.
3. I will search out new technologies, processes, techniques, and/or product ideas.
4. I will suggest new ways to increase quality.
5. I am a good source of creative ideas.
6. I am not afraid to take risks.
7. I will promote and champion ideas to others.
8. I will exhibit creativity on the job when given the opportunity.
9. I will develop adequate plans and schedules for the implementation of new ideas.
10. I often have new and innovative ideas.
11. I will come up with creative solutions to problems.
12. I often have a fresh approach to problems.
13. I will suggest new ways of performing tasks.

Responses are on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

9.5 APPENDIX 5: RECRUITMENT POSTER

VOULEZ-VOUS FAIRE AVANCER LA SCIENCE? ÊTES-VOUS CRÉATIF(VE)?

Nous sommes présentement à la recherche de volontaires pour participer à une étude dans le cadre d'un mémoire de maîtrise sur le bilinguisme et la créativité à HEC Montréal.

Vous devez avoir le français comme langue première, être étudiant(e) au cycle supérieur ou jeune professionnel(le) dans des domaines créatifs et novateurs, où vous êtes appelé(e) à innover (marketing, publicité, design, relations publiques, stratégie, communications, recherche scientifique, technologies, arts, etc.).



COMPENSATION POUR 30
MINUTES DE VOTRE TEMPS :

40.00\$

Date : sur rendez-vous, flexible

Lieu : HEC Montréal, bureau de Concertation Montréal, ou votre bureau.

Durée : 30 à 40 minutes

Déroulement :

1. Pré-questionnaire
2. Exécution d'une tâche
3. Post-questionnaire

Confidentialité des données : oui

Pour toute question et/ou pour participer, veuillez communiquer avec le chercheur principal Simon Blanchette au 514-260-1880 ou à simon.blanchette@hec.ca.

HEC MONTRÉAL

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9.6 APPENDIX 6: SELF-ASSESSED CREATIVITY SCALE CORRELATION TABLE

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Q5</i>	<i>Q6</i>	<i>Q7</i>	<i>Q8</i>	<i>Average Creativity</i>
<i>Q1</i>	1	0.63	0.44	0.36	0.29	0.20	0.14	0.26	0.59
<i>Q2</i>		1	0.48	0.31	0.44	0.37	0.09	0.35	0.66
<i>Q3</i>			1	0.41	0.32	0.30	0.23	0.48	0.71
<i>Q4</i>				1	0.36	0.53	0.31	0.69	0.75
<i>Q5</i>					1	0.25	-0.01	0.32	0.54
<i>Q6</i>						1	0.53	0.71	0.74
<i>Q7</i>							1	0.33	0.51
<i>Q8</i>								1	0.79

- Q1: Je vais suggérer de nouvelles approches pour atteindre les objectifs/buts.
- Q2: Je vais développer des approches novatrices et pratiques pour améliorer les performances.
- Q3: Je vais tenter de trouver de nouveaux processus, technologies, techniques, et/ou idées de produits.
- Q4: Je suis une bonne source d'idées créatives.
- Q5: Je vais démontrer de la créativité dans mon travail lorsque j'en ai l'opportunité.
- Q6: J'ai souvent des idées nouvelles et novatrices.
- Q7: Je vais trouver des solutions créatives aux problèmes.
- Q8: Je suis une personne créative.
- Average creativity: The average self-assessed creativity when combining the eight questions.

