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Consumer Financial Spinning : How Investors Disconnect from their Initial Financial Needs, Goals, and Preferences

CAHIER DE RECHERCHE

UNIVERSITÉ DE SHERBROOKE

Préambule

La gestion financière responsable vise la maximisation de la richesse relative au risque dans le respect du bien commun des diverses parties prenantes, actuelles et futures, tant de l'entreprise que de l'économie en général. Bien que ce concept ne soit pas en contradiction avec la définition de la théorie financière moderne, les applications qui en découlent exigent un comportement à la fois financièrement et socialement responsable. La gestion responsable des risques financiers, le cadre réglementaire et les mécanismes de saine gouvernance doivent pallier aux lacunes d'un système parfois trop permissif et naïf à l'égard des actions des intervenants de la libre entreprise.

Or, certaines pratiques de l'industrie de la finance et de dirigeants d'entreprises ont été sévèrement critiquées depuis le début des années 2000. De la bulle technologique (2000) jusqu'à la mise en lumière de crimes financiers [Enron (2001) et Worldcom (2002)], en passant par la mauvaise évaluation des titres toxiques lors de la crise des subprimes (2007), la fragilité du secteur financier américain (2008) et le lourd endettement de certains pays souverains, la dernière décennie a été marquée par plusieurs événements qui font ressortir plusieurs éléments inadéquats de la gestion financière. Une gestion de risque plus responsable, une meilleure compréhension des comportements des gestionnaires, des modèles d'évaluation plus performants et complets intégrant des critères extra-financiers, l'établissement d'un cadre réglementaire axé sur la pérennité du bien commun d'une société constituent autant de pistes de solution auxquels doivent s'intéresser tant les académiciens que les professionnels de l'industrie. C'est en mettant à contribution tant le savoir scientifique et pratique que nous pourrons faire passer la finance responsable d'un positionnement en périphérie de la finance fondamentale à une place plus centrale. Le développement des connaissances en finance responsable est au cœur de la mission et des intérêts de recherche de la Chaire Desjardins en finance responsable et des membres du Groupe de Recherche en Finance Appliquée (GReFA) de l'Université de Sherbrooke.

Le présent cahier de recherche présente le concept de « spinning financier du consommateur » (*consumer financial spinning*). Cela se produit lorsque les investisseurs (ou emprunteurs) réels ou potentiels perdent la trace de leur motivation initiale à acquérir des produits à forte valeur financière, de leurs buts et de leurs préférences, et s'engagent involontairement dans une sorte de roue de la malchance, ressemblant ainsi à des hamsters dans une cage en quelque sorte. Ils sont ainsi incités à dépenser et à s'endetter sans même s'en rendre compte. Ce document prend pour exemple la crise financière mondiale de 2007-2009 (*Global Financial Crisis, GFC,* ou crise des subprimes) au cours de laquelle l'utilisation de techniques marketing et financières par des vendeurs de prêts hypothécaires prédateurs (subprime) et des partisans d'une réglementation laxiste ont conduit les consommateurs américains à ignorer le piège de la dette qui les guettait.

Consumer Financial Spinning: How Investors Disconnect from their Initial Financial Needs, Goals, and Preferences

Working Paper

By

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Résumé

Le présent cahier de recherche présente le concept de « spinning financier du consommateur » (*consumer financial spinning*). Cela se produit lorsque les investisseurs (ou emprunteurs) réels ou potentiels perdent la trace de leur motivation initiale à acquérir des produits à forte valeur financière, de leurs buts et de leurs préférences, et s'engagent involontairement dans une sorte de roue de la malchance, ressemblant ainsi à des hamsters dans une cage en quelque sorte. Ils sont ainsi incités à dépenser et à s'endetter sans même s'en rendre compte. Ce document prend pour exemple la crise financière mondiale de 2007-2009 (*Global Financial Crisis, GFC,* ou crise des subprimes) au cours de laquelle l'utilisation de techniques marketing et financières par des vendeurs de prêts hypothécaires prédateurs (subprime) et des partisans d'une réglementation laxiste ont conduit les consommateurs américains à ignorer le piège de la dette qui les guettait. Nous discutons des résultats d'une expérience d'imagerie par résonance magnétique fonctionnelle (IRM*f*) que nous avons menée pour tester la cupidité, l'aversion au risque et le phénomène de spinning. Nous croyons qu'il s'agit là de la toute première tentative académique d'examiner le spinning financier en recourant à un outil expérimental régulièrement utilisé dans la recherche en neurosciences et en psychologie. Nous postulons que les régulateurs gouvernementaux devraient prendre en compte le rôle des tactiques marketing et financières incitant au spinning lors de l'élaboration de leurs politiques. D'autre part, les responsables marketing des institutions financières, qui s'efforcent d'éduquer les consommateurs et de les aider à réduire leur endettement, favorisant ainsi un meilleur pouvoir d'achat, bénéficieront d'une compréhension de ces comportements de spinning et adapteront leurs campagnes promotionnelles en conséquence. Nous pensons qu'il devrait y avoir des conséquences juridiques envers ceux qui invitent au spinning financier, car cette invitation est intentionnellement trompeuse et nuit au final aux consommateurs de produits financiers.

Abstract

This working paper introduces the concept of consumer financial spinning. This occurs when investors (or borrowers) or would-be investors have lost track of their initial motivation to acquire products with significant financial value and engage unwittingly in hamster-like spinning in a "wheel of misfortune", being encouraged to spend through sweetheart deals and thus incur debt without even realizing it. This paper takes for example the Global Financial Crisis of 2007-2009 (GFC) during which the use of such sweeteners by sellers of predatory mortgages and advocates for lax regulations led U.S. consumers to spin and, in the process, ignore the debt trap they were falling into. We discuss the results of a functional magnetic resonance imaging (*f*MRI) experiment we conducted to test the ratio of greed over risk aversion and the hypothesized phenomenon of spinning. We believe that this is the first academic attempt to examine financial spinning resorting to an experimental tool used regularly in neuroscience and psychology research. Our framework indicates that government regulators should take the role of marketing sweeteners into account when devising policies. Marketing managers of financial institutions, who strive to educate consumers and help them reduce their debt load, thus promoting better purchasing power, stand to benefit from an understanding of these possible spinning behaviors and adapt their campaigns accordingly. We believe that there should be legal consequences for encouraging financial spinning, as this at times may be an intentional and deceitful invitation for clients to harm themselves financially.

Keywords: Debt Trap, Greed, Market Contagion, Market Friction, Regulations, Risk Aversion, Spinning

Context

Since the very beginning of the financial market system, there have been numerous examples of market downturns around the world. Famous instances include the Dutch Tulipomania in the 17th century in Holland, the Mississippi Bubble in France in the 18th

century and the savings and loan fiasco in the United States in the 1980s (Kindleberger 1996, Rajan 2010, Sorescu *et al.* 2018). Indeed, markets and corporations are prone to dubious behaviors (Brunnermeier and Sannikov 2014) and, in some cases, even illegal corporate activities (Cloninger and Waller 2000), Enron or Madoff being examples among many others. During these crises, many consumers of products with significant real or potential financial value first become overly excited and lose track of proper risk assessment. When things go sour, however, they panic and make decisions that further accelerate their downfall and that of the market. They spin, in the sense that they lose focus on their initial financial motivation (needs), goals, and preferences due to market forces (such as promotional sweet deals or contagion factors) and frictions (such as volatility), which amount to stress factors.

The absence of appropriate regulatory institutions and measures (Campbell 2019), including with respect to advertising, from the 17th to the beginning of the 20th century has jeopardized financial stability, but this has been mitigated by the creation of, for example, the U.S. Federal Reserve Bank[1] (Grossman and Meissner 2010) and the introduction of laws regulating or banning misleading advertising, such as Section 15 of the *Federal Trade Commission Act*. Yet, the questionable management of government-run businesses such as Fannie Mae and Freddie Mac during the Global Financial Crisis (GFC) (Brunnermeier and Pedersen 2009; Ben-David 2011) and the lack of proper contemporary measures[2] demand scrutiny (Calomiris and Wallison 2008), and so does the use of heavy, often deceptive advertising. The 2007-2009 GFC is one example among many others that illustrates how speculation and the publicity around toxic products that comes with it have eroded the trust in businesses, community welfare, and consumer confidence (Samoa and Shoaf 2005, Brown 2010). The U.S. subprime crisis left the economy carrying a trillion dollars in dubitable

[1] The "Fed" (Federal Reserve Bank), which controls interest rates and hence mortgage rates in the U.S.

[2] Numerous scholars have highlighted how past market regulations left consumers unprotected (Merrouche and Nier, 2010; Wheelock and Wohar, 2009). As further examples, the following were never passed into law (date introduced): *Consumer Mortgage Protection Act* (April 6, 2000); *Predatory Lending Consumer Protection Act* (April 12, 2000); *Predatory Lending Consumer Protection* (March 15, 2001); *Protecting Our Communities From Predatory Lending Practices Act* (Dec. 20, 2001); *Predatory Mortgage Lending Practices Reduction Act* (Feb. 27, 2002); *Mortgage Loan Consumer Protection Act* (May 22, 2002); *Predatory Mortgage Lending Practices Reduction Act* (April 8, 2003*); Prevention of Predatory Lending Through Education Act* (April 29, 2003); *Prohibit Predatory Lending Act* (March 9, 2005); *Responsible Lending Act* (March 15, 2005); Mortgage *Reform and Anti-Predatory Lending Act* of 2007 (Oct. 22, 2007); *Fair and Responsible Lending Act* (Dec. 8, 2005) – Igan, Mishra, and Tressel 2011. Hence, problems were recognized, but no action was deemed necessary.

mortgages (Frame *et al.* 2008, p. 4). In parallel, between 2005 and 2008, the Federal Reserve increased its key lending rate, from roughly 1 to 5 percent, which caused housing construction to slow down sharply, from 2 to 1.5 million units, to 500,000 units[3] built in 2010. With the start of the economic downfall, consumer debt built up steadily, resulting in numerous delinquencies and foreclosures, 50% of which were linked to predatory loans, the equivalent of 2% of U.S. GDP[4]. Both the International Monetary Fund (IMF 2009, Chap. 2) and the Financial Crisis Inquiry Commission report (2011, p. XVI) criticized the lack of proper regulations and the reckless promotion of risk-free and easy credit (Fostel and Geanakoplos 2012). Academics blamed advertising and promotion practices for magnifying efforts and tactics to hide the real risk associated with subprime mortgages (West and Prendergast 2009). In short, the crisis did not emerge out of nowhere (Razin and Rosefielde 2011); it was a consequence of "unruly deregulation" (Krugman 2009). Already in the late 1970s, the *U.S. Community Reinvestment Act* (CRA) opened the door to leniency, with banks permitted to grant credits to unqualified clients, a tendency that became even more pronounced in the 1990s with the *Glass-Stegall Act* revision (Taylor 2007, White 2009).

Purpose of this Working Paper

This paper seeks to develop the understanding of consumer financial spinning, whereby investors/borrowers disconnect from their initial financial needs, goals, and preferences. We attempt to explain how various market agents – not only regulators and sellers of predatory mortgages but also buyers-turned-sellers who flipped their houses at a profit – fostered greedy consumer behaviors by using various marketing/financial "sweeteners" (sweet deals). Sweeteners enticed naive, gullible consumers into ignoring impending debt traps and jumping into the house-buying frenzy by making their offers more appealing than they truly were (Miles 2013). An example of the influence of sweeteners is that of teaser rates, by which mortgagees benefited from subprime rates for a short period (usually one year); research has indeed shown that risk-free rates motivated buyers to take on more risk (Ganzach and Wohl

[3] Research.stlouisfed.org. Accessed Feb. 1, 2019.
[4] U.S. Census Bureau and World Bank, Accessed Feb. 1, 2019.

2018). Hill and Kozup (2007) convincingly describe how the subprime mortgages that invaded the U.S. market during the period 2007-2009 were consumer loans with at least one of the following elements present: "aggressive and deceptive marketing, lack of concern for the borrower's ability to pay, high interest rates and excessive fees, unnecessary provisions that do not benefit the borrower… large prepayment penalties, or faulty underwriting…" (p. 29). The authors recognize that some lenders or house-flippers targeted vulnerable people who were exploited by way of incomplete disclosure of information, thus favoring "irrational choices" (p. 32) tied to unfair contracts (p. 40).

Working Paper Layout

In the next section of this working paper, we introduce our framework of consumer/borrower financial spinning and marketing sweeteners and explain its operation. We discuss marketing sweeteners because we postulate consumers would not be distracted from their initial motivation to consume products of significant financial value, goals, and preferences and start spinning their "wheel of misfortune" (Mesly *et al.,* 2020), like a clueless hamster, if they did not have something that encourages them to do so. In the subsequent section, we present our exploratory research using functional magnetic resonance imaging (*f*MRI) study of 19 participants, which reinforce the notion that fear affects financial decision-making (see the Appendix). The outcome reinforces previous work showing that people do indeed make more mistakes when feeling vulnerable (Starcke and Brand 2012). We correlate fear with greed and the perceived risk of a debt trap (Scherbina and Schlusche 2013) or, in other words, risk aversion (Lucas 1978). We consider greed to be the fear of not entering the booming housing (bull) market on time to make a quick profit, and we interpret the perceived risk of a debt trap as the fear of not exiting a collapsing (bear) market that would cause housing assets to lose their value quickly, making it impossible to repay debt and thus causing foreclosures. Our study does not directly measure the influence of sweeteners during the GFC, as doing so would have required an extensive longitudinal study with many uncontrollable variables. Rather, the study only points in the direction that, perhaps, given the right

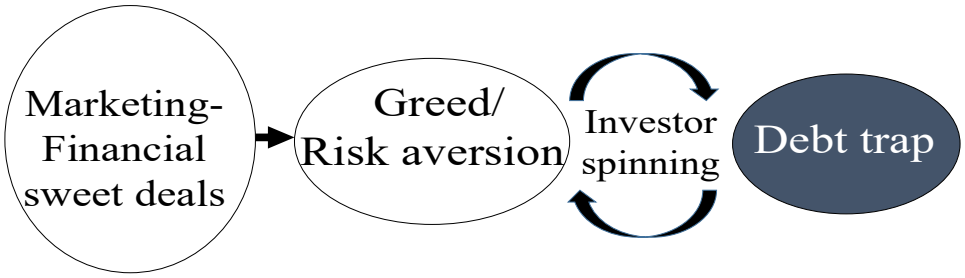
sweeteners, people would tend to ignore the real risk and start spinning. Our research is exploratory and aims to prepare a path for future research.

In the following section, we discuss our results and outline their meaning. In the U.S. market and leading to the GFC, greed or the fear of not entering the booming market on time overwhelmed the perceived risk of a debt trap. We contend that this greed or fear occurred in part under the influence of the various marketing sweeteners that filled the market and enticed consumers/would-be investors to spin. Our concept of consumer financial spinning being an emerging one, we cannot firmly establish that it took place during the GFC, but we contend that it could be the case and that future research is warranted. In our conclusion, we emphasize the importance of regulators understanding how marketing tactics such as sweeteners influence the market when devising economic policies, state the limits of our study, and explore avenues for future research.

Marketing Sweeteners – A Proposed Framework

We present a framework of sweeteners that attempts to illustrate how the U.S. market behaved in 2000-2009. Our simplified framework, which places the principal market agents in dynamic relations with one another (Nejad 2016), is illustrated in Figure 1:

Figure 1 – A Simplified, Longitudinal Version of the Process Leading to Consumer Financial Spinning



Note: This stylized and simplified framework shows how marketing sweet deals (sweeteners) nurture greed to the detriment of proper risk assessment (hence, the ratio greed/risk aversion), leading customers towards a debt trap through the process of spinning, which leads to an end point when the debt becomes unsustainable (and forces foreclosure, in the case of the GFC). The wheel of misfortune is rendered by the two connecting, curved arrows.

As seen in Figure 1, marketing sweetener deals are created to maximize greed but to minimize risk (notably by hiding risk as far as possible along the chain of financial institutions), thus encouraging consumption. In the process of overconsuming, consumers walk blindly into a debt trap. They ignore it and keep buying for the sake of buying, thus spinning their wheel of misfortune, until such time as the economic system itself spins out of control (crisis), as exemplified during the GFC.

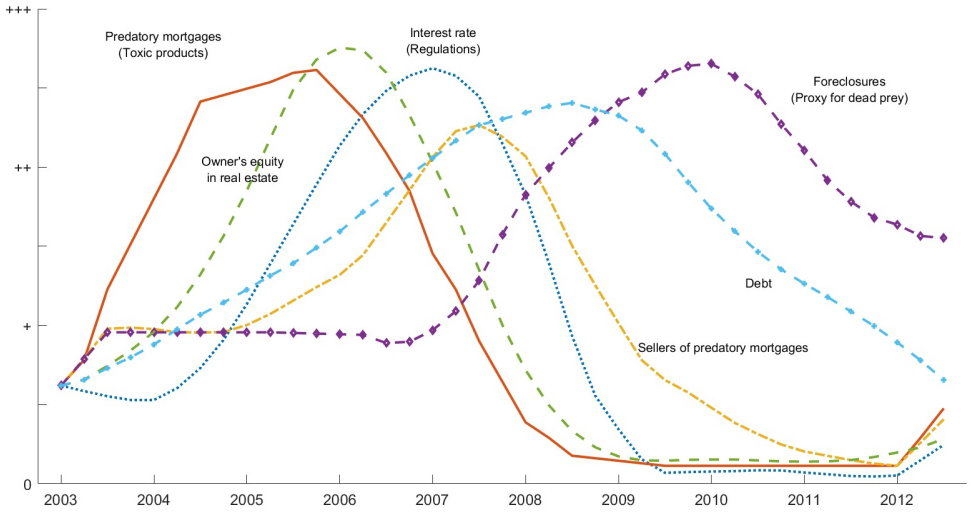
Framework Assumptions Based on U.S. Market Data

Models (or frameworks) invariably are simplifications of reality and inevitably rest on key assumptions (Samuel, 2009). Ours, consistent with the works of Mesly *et al.* (2018) and Huck *et al*. (2019), are as follows.

Our first assumption is that the market comprises four market agents: two policy-driven variables – government actions as defined by the Federal Reserve's interest rates, and the ratio

of predatory to total mortgages – and two agent-driven variables – sellers of predatory mortgages as measured by the ratio of shadow[5] to traditional banking, and buyers of those predatory mortgages as measured by [1 - foreclosures]. This last equation describes a healthy population that will eventually become prey to the sellers of predatory mortgages. We assume these measures plausibly represent market forces for the purposes of our modeling effort. The interest rates act as a predator of sorts towards the predatory mortgages; as the rates increase, the attractiveness of these toxic products diminishes. Previous authors have shown that the U.S. subprime market exhibits Lotka-Volterra predator-prey relationships between these policy- and agent-driven market variables (Huck *et al.* 2019, Brady 2017, Lotka 1920, 1925, Volterra 1926, 1931) (Figure 2):

Figure 2. U.S. Market Data Exhibiting Lolka-Volterra (LV) Patterns



Notes: Curves based on actual market data in the U.S. pointing to LV patterns.

The market data used to create Figure 1 provide a summative portrait of what happened in the U.S. during the GFC. Predatory mortgages kept rising due to the lack of regulations, and with them rose heavy advertising aimed at luring potential customers into buying one or

[5] The term "shadow banking" describes the activities of banks that escape the normal regulatory system (Gennaioli, Shleifer, and Vishny 2013).

multiple houses. The Federal Reserve raised the interest rate to cool the overheated market, and the result was consistent with typical Lotka-Volterra predator-prey dynamics[6]. As the number of product mortgages increased, so did the number of sellers of these products. With the end of the mortgage grace period (usually a year or two for subprime mortgages), buyers of houses suddenly faced the harsh reality of having to renew their mortgages at much higher rates than initially led to believe. Their inescapable debt transformed them from overly optimistic buyers to prey, as signaled by the spike in foreclosures. The "owners' equity in real estate" curve illustrates the entire market dynamic when coupled with that of debt-to-disposable income; debt kept increasing even though buyers stopped investing in real estate. Clearly, their predatory mortgages caught up to them.

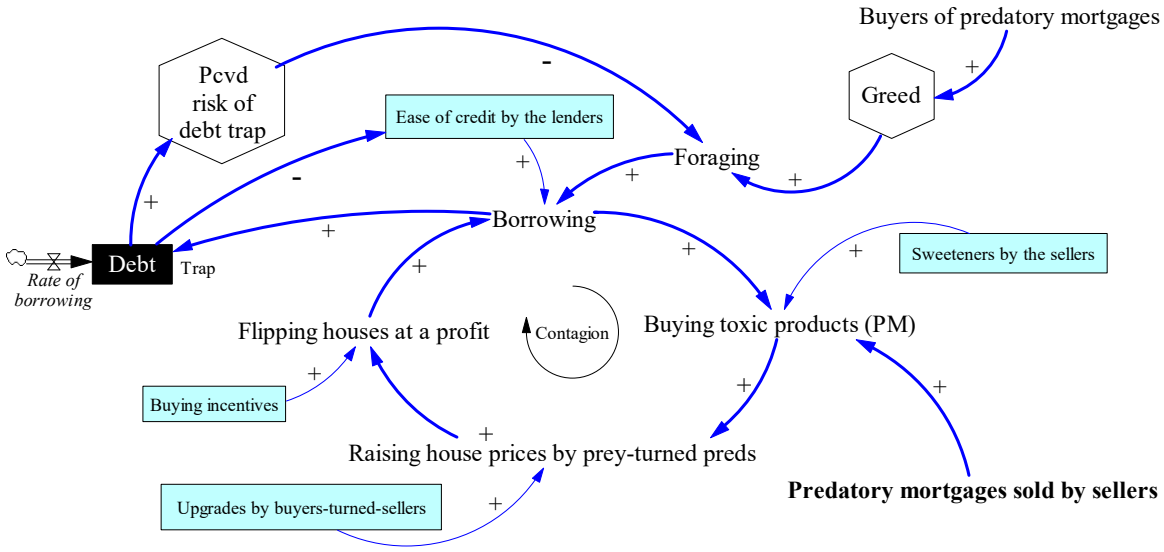
Our second assumption is that the Federal Reserve increased the interest rate with the main objective of avoiding debt accumulation. The Federal Reserve sought to avoid an unmanageable debt-to-disposable income ratio; consumers embedded in such circumstance would not be able to repay their debt and pay their income tax. Excessive consumer debt is, obviously, harmful to the economy; as stated by Bordo and Meissner (2012), "Overall, there is a strong positive relationship between real credit growth and the probability of having a banking crisis". Our third and last assumption is that in a hot market, greed is at the heart of the typical buyer. We define greed as the fear of not entering the hot (bull) market on time and its opposite, the fear of a possible debt trap, as the fear of not exiting a bust (bear) market on time. Fear is thus at the core of our framework, like two sides of a coin. When buyers become fearless upon facing the risk of debt traps, worrying instead that they will not be able to benefit from profit-generating booming markets, they become vulnerable, which soon translates into them carrying unbearable debt (Keltner and Gross 1999; Kunzmann, Kappes, and Wrosch 2014).

[6] LV dynamics refer to differential equations vastly used in ethology and occasionally used in economics. They explain how a long-term equilibrium is reached between predators and prey in a particular ecosystem.

The Consumer Spinning Framework Using Dynamic Systems

Figure 3 offers a complex, dynamic system version of Figure 1, while keeping the same logical sequence of behaviors.

Figure 3 – The Consolidated Model of Financial Predation and the Use of Sweeteners



Notes: In this complex framework based on dynamical systems, psychological constructs are in a hexagonal. "Predatory mortgages sold by sellers" is the starting point and the debt trap is the end point of the framework, thus respecting the tenets of the data percolation methodology (Mesly, 2015). The wheel of misfortune is evidenced by the largest circle that contains borrowing, buying, raising prices, and flipping.

The framework in Figure 3 uses a systems dynamics approach, which previous researchers have identified as a more appropriate and more dynamic approach than structural equation modeling (SEM) when dealing with complex phenomena (Chintagunta *et al.* 2006, Rutz and Sonnier 2011). SEM focuses mostly on static psychological constructs and needs to be tested with data retrieved from questionnaires addressing latent and actual constructs in a single scenario (e.g., how respondents feel at a given time). On the other hand, dynamic

systems can test a single psychological phenomenon, such as fear, and see how it evolves over time given different scenarios (Forrester 1994).

Interpreting the Framework

The framework in Figure 3 reads as follows: Buyers of predatory mortgages are greedy (at least, some of them), that is, geared towards materialistic values (Akerlof and Shiller 2015). Their search for houses and attractive borrowing terms amounts to foraging, as animals do in the wild (Bonsall and Hassell 2007). By foraging, we mean that eager borrowers look for the least threatening lender, one that can eventually and unfortunately become a predator. Unlike in nature, where animals forage for food (e.g., a squirrel digging the ground to recover a hidden nut) and hide or run away from their natural predators, in a financial setting, things are quite different. Eager borrowers seek money (forage) but they must seek it from people who can become their predators (the lenders), and these people are from the same "species". Lacking a real choice, they seek out the least threatening lender, one they are inclined to put the most trust in. As in the wild, foragers must always weigh the risks (of getting caught by the predator) and opportunities (to feed). In the financial world, ultimately the risk is the prospect of a debt trap; the opportunity is to flip houses and make money fast. When greed is high and the perceived risk of a debt trap is low, buyers engage in a contagion wheel (or what will become a wheel of misfortune). First, they borrow money; lenders make money access as attractive as possible by easing access, notably by lowering their qualifying standards. Buyers then acquire houses, contracting subprime mortgages in the process. These mortgages are "sweet deals" indeed, with teaser rates and other such incentives.

The buyers upgrade their recently-bought houses to make them as attractive as possible on the market, for example, by renovating the kitchens. They raise the prices on the recently purchased properties. At this point, the buyers become sellers, joining the population of predators. To encourage potential buyers, they sweeten their offers with advertising and buying incentives. In some reported cases, sellers offered free lawnmowers or similar inducement. Excited with the profit they have just made, the buyers-turned-sellers use their assets as collateral and buy even more houses, motivated as they are by greed and blinded by

sweeteners that hide the risk of a debt trap. In this way, the wheel starts turning. The buyers-cum-sellers increase their exposure to real risk (Claessens and Kodres 2014), making them more vulnerable to market volatility (Soman and Cheema 2002) as spinning continues. Other potential buyers join in, and soon buyers compete against each other, with the overall effect that each buyer becomes greedier (Hoffmann *et al.* 2012). Contagion takes place. However, this entire mechanism opens the faucet that fills in the "bathtub" of debt, with no drain available. The buyers/borrowers do not repay their debts. Instead, they keep borrowing because they think there is more money to be made, convinced that they are that house prices will go up and lending rates will remain low. In a state of spinning, however, even the thought of making more money becomes elusive; there comes a point where consumers are so baffled by market events that they simply spin the wheel of misfortune, not realizing they are increasing their debt load. Their numbness to risk will become their downfall.

Next, we review some of the key concepts of the consumer spinning framework using data from the U.S. GFC.

Greed and Risk Aversion

As suggested in Figures 1 and 3, we contend that greed and an absence of risk aversion were the psychological engines of the GFC (Reinhart and Rogoff 2009; Fostel and Geanakoplos 2012). From 2000 to 2010, over fifty percent of all foreclosures were due to subprime loans, and only 12% of which were first-lien mortgages. Evidently, excited consumers bought multiple houses that they could not afford to carry over the medium or even the short term (Frame *et al.*[7] 2008). We assume that past a certain point, consumers became desensitized to the market forces and frictions, were overloaded with information and sweet deals, and thus blindly engaged in spinning. Buyers of predatory mortgages acted as prey (hamsters of sorts). Their excessive overconfidence in the market mechanisms was fueled by extraordinarily aggressive marketing campaigns (Ben-David 2011) and their gullibility (Sama and Shoaf 2005, Frame *et al.* 2008). They could not resist the appeal of what a house represented to them: shelter, safety, belonging, wealth, status, and power. Their greed pushed

[7] http://www.federalreserveonline.org/pdf/mf_knowledge_snapshot-082708.pdf. Accessed March 12, 2018.

them towards more extravagant living (Shiller 2005) and to achieve such a lifestyle, they spent beyond their means.

In the introduction, we defined greed as the fear of missing out on the opportunity to enter a hot market on time (Lux 1995), one where one can make money fast by flipping houses[8] (Joo and Grable 2004). Seuntjens *et al.* (2015), for their part, define greed as follows: "Although greed is both hailed as the motor of economic growth and blamed as the cause of economic crises, very little is known about its psychological underpinnings." Greed is an unmonitored appetite for predatory utility maximization (Mesly *et al.* 2019); as such, it induces an exaggerated level of need (with loaded tension) for what should be a normal need (Lewin 1951, Maslow 1954). That exaggerated level of need is the fear of not accessing necessary resources (or not entering the market on time), counterbalanced by the fear of not exiting a threatening market on time (Fay and Xie 2010), that is, perceived risk (Hoover *et al.* 1978). This behavioral mechanism is the financial version of foraging in nature. Animals constantly weigh fulfilling their physiological and procreation needs (greed) against the fear of being caught by a predator (the debt trap) (Paulssen, Roulet, and Wilke 2014). When greed exceeds perceived risk (or risk aversion), consumers forego the proper search for valuable information (Bikhchandani and Sharma 2000, Calvo and Mendoza 2000, Shiller 2005), and sink into an optimistic profit-making view of the market (Abreu and Brunnermeier 2003). Thus, they end up acting against their own welfare (Devereux and Sutherland 2010). During the GFC, eager house buyers became excited by the sweet deals that were offered to them, ignoring the toxicity that at some point down the road would harm them (Akerlof and Shiller

[8] The likely causes associated with greed include the following: window-dressing "sweetheart deals" and teaser rates (Neal and Wheatley, 1998, Akerlof and Shiller 2009, Schiller 2005, Besanko *et al*. 2014), which describe in part what we call "sweeteners"; thrill seeking and gambling; a psychological mindset geared towards consumerism; creating an artificial boom (Glaeser, Gyourkob, and Saizb 2008; building-up volatility, an element that made consumers nervous (Cochrane 2005, Duca, Muellbauer, and Murphy 2010, Priewe 2010); the misleading belief that deficits promote economic growth (Díaz Alejandro, and Reinhart 2015); gullibility; vulnerability; deficient cognitive capabilities; fear affecting the decision to invest; a contagion (herding) or group effect (Bougheas *et al.* 2015); utility maximization; the lack of substitutes; the deceitful over-estimation of credit ratings granted to large financial institutions; the weaknesses of policy-making (Stiglitz 2003, Sama and Shoaf 2005, Krugman 2009); a "too big to fail" philosophy (Díaz Alejandro and Reinhart 2015); abuse of the credit expansionary system; free-riding and weak controls; the use of home as an asset and associated home bias; irrationality; and the asymmetric impact of rational and irrational components of a fear index on S&P 500 index returns (Soydemir, Verma, and Wagner 2017).

2015). In fact, by narrowing their investment efforts to housing and by buying into the sweet deals (e.g., predatory mortgages), consumers made themselves vulnerable to market volatility.

We argue that asymmetric risk attitude, biased information search, illusions of quick profits, minimizing loss aversion[9], and overconfidence (Gärling *et al.* 2009) all fostered that vulnerability, which, as Figure 1 illustrates, led to vast numbers of foreclosures in the wake of the contagion effect (Grether and Plott, 1979). Aggressive publicity in favor of subprime mortgages, spreading from as early as the year 2000 to 2018, helped blur the market, making toxic products look appealing (Ben-David 2011).

Deceit

Concerning some sellers of predatory mortgages, Shiller (2005, p. 76) describes them as follows: "When clever persons become professionals at deceiving people, and devote years to perfect their act, they can put seemingly impossible feats before our eyes and fool us, at least for a while." The predatory mortgages served as toxic (Wiles *et al.* 2010), deceitful instruments presenting "terms and conditions that ultimately harm[ed] borrowers" [10]. Unknowingly, excited home buyers got themselves in a debt trap (Aoki *et al.* 2004, Mian and Sufi 2010), one that revealed itself when the Federal Reserve increased the interest rates rather suddenly to cool off the market. In our sweetener framework whereby sweet deals are

[9] The likely causes associated more particularly with the fear of a debt trap or with hiding the risk of a debt trap include the following: a mounting predilection for excess deficit spending (Díaz Alejandro, and Reinhart 2015); the effect of credit on spending decisions and the role of credit limits and credibility (Soman and Cheema 2002); fostering weak controls and unjustified tax breaks (Krugman 2009, Rajan 2010, Stiglitz 2003); lack of product standardization (IMF 2009a,b); moral hazard, securitization and risk hiding (Ericson and Doyle 2003; Brunnermeier and Sannikov 2014, Corneil and McNamara 2010, Díaz Alejandro, and Reinhart 2015); provision of a false sense of security (e.g., the use of the Federal Reserve Bank as a lender of last resort); resorting to creative accounting (Akerlof and Shiller 2009); shadow banking; taking advantage of market frictions and friction-loaded mechanisms (Fenzl and Pelzmann, 2012); the use of complexity (Nadauld and Sherlund 2008, Akerlof and Shiller 2009); the absence of proper controls (Acharya and Richardson 2009, Obstfeld and Rogoff 2009, Bernanke 2009, Portes 2009); the amalgamation of real and hidden risks in the U.S. financial sector and their being hidden in complex financial instruments (Caballero and Krishnamurthy 2009); lenient monetary and regulation laissez-faire policies (initiated in 1977 with a lax regulations setup of the U.S. CRA – Kaminsky and Schmukler 2003, Hellwig 2008, White 2009, Krahnen and Franke 2009, Posner 2009); reckless and institutionalized credit lending practices (Borio and Drehmann 2009, Priewe 2010); the use of technological innovation to hide risk (Demarzo, Kaniel, and Kremer 2007); the abuse of asymmetry of information (Milgrom and Roberts 1982); and the voluntary registration of U.S.-domiciled hedge funds (Brown *et al.* 2009).

[10] https://www.gao.gov/. Government Accountability Office, 2004, p. 3. Accessed January 9, 2019.

designed to hide the toxicity of the market, the household debt-to-disposable income ratio constitutes one crucial indicator that justifies the Federal Reserve's intervention. Indeed, "Financial crises are ultimately related to two problems: insolvency and illiquidity" (Hinds 2009). From 2000 to 2007, the U.S. household mortgage debt to consumption ratio rose from roughly 2.5 to 4.5, declining to 3 by 2015. At the same time, the ratio of housing rent to consumption decreased from approximately 0.08 to 0.07, whereas the ratio of consumption to income increased from 0.90 to 0.94 in 2005 and leveled at 0.87 in 2015.

Debt Trap

Mortgage debt indeed ballooned approximately twofold for predatory mortgages (Albanesigiacomo De Giorgi, and Nosal 2017). In this doomed scenario, the opportunity to avoid one's financial obligations is nil – hence the term "trap" (or wheel of misfortune). This may not apply to all buyers, but it certainly applied during the GFC to all those who ended up having to go through foreclosures: unable to meet their financial obligations, they had to relinquish their houses (and homes). Figure 1 illustrates this scenario with actual market data, showing the progression of debt over time and the lagged increase in foreclosures (a process that takes time to implement). More generally, some consumers tend to overborrow, thus becoming "more likely to enter a cycle of debt", simply because they become fearful of the scarcity of the asset they long for (Cook and Sadeghein 2018, p. 78) – namely, houses in the case of the GFC. Worse still, for most home buyers during the GFC in the U.S., the debt incurred with house purchasing was associated with substantial credit card expenses (Case, John, and Shiller 2005, Mishkin 2007, Guiso, Sapienza, and Zingales 2009, Elul *et al.* 2010). The system represented in Figures 1 and 3 is thus highly toxic (Carroll, Otsuka, and Slacalek 2011). As an example, home buyers usually buy a new car within two years of moving in (Mian and Sufi 2009). The debt trap is best exemplified by the U.S. phenomenon of food stamps; between 2004 and 2009, they rose from 25 to some 50 million units[11]. Figuratively, during that period, consumers across all income levels spun the wheel of misfortune (the contagion circle in Figures 1 and 3, hinted at by the assumed LV functions exhibited in Figure

[11] http://fns.usda.gov/pd/snapsummary.htm. Accessed Feb. 3, 2019.

2) and filled the bathtub of their accumulated debt to the point of overflow (Antoinette and Schoar 2016, Gelain, Lansing, and Natvik 2018).

Contagion

We posit that the interaction between the policy-driven and agent-driven variables created the contagion process that plagued the U.S. economy starting in 2000 (Olsen 2012, Dass, Massa, and Patgiri 2008, Diebold and Yılmaz 2014). Contagion was heightened by the fact that many cupid house buyers were naive and gullible (Sama and Shoaf 2005), potentially easily influenced by aggressive advertising campaigns. Indeed, more than 50% of all foreclosures between 1999 and 2011 were tied to predatory mortgages, with a quarter of them caused by poor credit (Frame *et al.* 2008). Consumers who became greedier and less vigilant towards the risk of a debt trap were often in the low-income bracket (Iacoviello 2008, Roy and Kemme 2012) and had poor literacy levels, thus making them more susceptible to heavy advertising (Danis and Pennington-Cross 2008, Wang 2009, Kamihigashi 2008). In some sectors, up to eighty percent of fraud victims were aged 65 years or more (Yoon *et al.* 2005), many of whom experienced the "sharpest increase in bankruptcy filing" (Thorne, Warren, and Sullivan 2009). Gullible consumers realized towards the end of 2008 that the government could not protect them (Graafland and van de Ven 2011). Legal recourses were scarce or outrageously unaffordable (Ferguson 2012). The price paid for greed and reduced risk perception was indebtedness (MacInnis and Mello 2005, McCoy *et al.* 2009). To make matters worse, in an economic system where the fear of not entering the booming market on time far outweighed the fear of falling into default, delinquency or foreclosure, the only logical means of surviving was through deceit, including in advertising (Cox, Cox, and Zimet 2006). Indeed, strategic, regulatory, and legal misstatements constituted over 25% of all messages during the GFC (Brown *et al.* 2009).

The Marketing Sweeteners

Our framework (Figure 3) identifies four opportunities to activate marketing-financial sweeteners (sweet deals), which we posit are the necessary ingredients to entice consumers/would-be investors to spin (like an apple given to a horse as a reward for having performed in a circus show): during the borrowing, purchasing, renovating and actual selling. At each stage, it is to the profit seekers' best advantage to find means of sweetening their actions (sugarcoating their poison pills) and luring their prey into becoming greedier and less vigilant about the debt-trap risk. Assuming consumers are not greedy and that the risk of a debt trap is high, would they borrow money? Certainly not, unless the cost of money was unusually low. Would they buy houses they do not really need? Unlikely, unless they can access very low rates, at least for a short while. Would they invest in renovating the house? No, not unless the market shows a tendency for prices to go up. Would they sell the houses and offer incentives out of their own pockets? No, not unless they can turn in a rewarding profit that allows them to access to easy credit. In short, we posit that the GFC could not have taken place without these four sweeteners. Of course, financial literacy can be a source of help to assist trapped consumers to get out of their financial misery. However, things are not that simple. In markets where moral hazard (defined as, "the failure to either behave diligently or in good faith at any point in the exchange"; Ericson and Doyle 2003, p. 11) accompanies the "fear factor" of price fluctuations (Obi, Dubihlelaband, and Choi 2012), consumers at times build their wealth expectations on faulty heuristics and biases that confound their judgments (Kahneman and Tversky 1979, Chaiken 1980) as well as on poor investment habits, exhibiting a significant lack of self-control (Helweg-Larsen and Shepperd 2001). Their appetite for a quick profit or greed (Shefrin 2000) silences any reasonable efforts at adequate risk assessment (Hoffmann, Krause, and Laubach 2012).

We can conceive of sweeteners as smoothies of sorts in times of impending crisis (Dutt and Padmanabhan 2011), which entice consumers to lose track of their initial consuming motivation and foundation and drive them to simply behave, that is, in a GFC type of market, to spin the wheel of misfortune, much like a hamster. Assuming consumers/would-be

investors during the GFC were moderately greedy and were able to perceive a certain level of risk associated with the subprime mortgages, and adopting the classical economic assumptions that they are rational and well-informed (Colander *et al.* 2009), it makes little sense to believe they would have embarked on a somber journey that saw them accumulating debt and eventually facing foreclosures in the thousands. Logically, the sellers found means to make his toxic products appealing; we call these means sweeteners.

As mentioned, our framework includes four sweeteners: (1) ease of credit; (2) incentives provided by sellers; (3) upgrades – sweetening the house; and (4) buying incentives (sweetening the buying appeal). We discuss these four sweeteners and how they interact to favor a contagion (herding) effect long recognized by economists. In their review of the causes of the GFC, academics and government officials have convincingly established that avid buyers borrowed heavily thanks to the facilitated access to credit (Rajan and Ramcharan 2012); many bought not one but multiple houses (Iyer, Soberman, and Villas-Boas 2005). Consumers and banks alike ignored risk and disregarded their ability to repay, a well-documented precursor of crises (Wellink 2009, Krishnamurthy and Muir 2017). In some instances, excited and deceitful consumers even misrepresented their financial status and altered their documents to benefit from subprime mortgages in what was labeled "predatory borrowing" (Bianco 2008). Plummeting lending criteria led greedy borrowers towards excessive borrowing to frantically buy houses in the hope of flipping them quickly for a hefty profit[12]. All pretexts were deemed credible to justify such attraction towards the sweetened credit, ranging from a historical motivation to establish fairness to the poorer class (Gayraud 2011) to achieving financial satisfaction (Moussa and Touzani 2016, Hansen 2014).

There is wide agreement among economists and academics that lenders sugarcoated mortgages via, for example, teaser rates, a trap into which countless buyers fell, based more on emotions than on mere cognition, in what Alan Greenspan, former head of the Federal Reserve, coined "irrational exuberance" (Hoffmann *et al.* 2012, Schiller 2005). Various authors have argued that aggressive advertising exacerbated mortgage appeal (Taute, McQuitty, and Sautter 2011). Home buyers renovated their properties by financing their efforts through credit; with improved versions of houses on the market and consumer demand

[12] International Monetary Fund (2009, Chap. 2).

ever ascending, selling prices went up. In fact, prices rose faster in geographical areas favoring subprime mortgages (Mian and Sufi 2009, Pavlov and Wachter 2011). Higher prices meant increased profits and, hence, leverage for further borrowing (Wachter 2015). Spending continued at an unprecedented scale. As stated by Greenspan and Kennedy (2008), "personal consumption expenditures towards home equity reached U.S. $136 billion per year from 2001 to 2006, three times the level of the years 1996 to 2000". This highly speculative (Del Negro and Otrok 2007), self-reinforcing toxic loop was encouraged by both individuals and astute financial companies, which created sophisticated products for the purpose of hiding risk (e.g., collateralized debt obligations, or CBOs, and special purpose entities or SPEs) (Van den Bulte and Stremersch 2004, In't Veld *et al.* 2011). To lure naïve buyers/would-be investors, house upgrades were occasionally enough. However, in other cases, promoters and buyers-turned-sellers imagined all kinds of promotional tricks, such as gifts, perks and the like (Bikhchandani and Sharma 2000, Dallery and van Treeck 2011). However, soon enough, the Federal Reserve increased the basic interest rate to quell the market agents' thirst, effectively forcing overstretched borrowers to seek refinancing (if at all available). Otherwise, they could tumble into default or face the shame and pain of foreclosure. As defaults mounted, a glut in the housing supply developed that depressed housing prices and further magnified the downfall of the market.

The Research

We laid out three hypotheses, which we tested using a dynamic-system approach that included various investment/fear scenarios:

Sweeteners help in part to hide the risks and encourage greed (e.g., during the GFC and this is probably true in any similar financial crisis).

1) The fear of not entering a hot market (bull market) on time to earn a quick profit, as well as, on the flip side, the fear of not exiting the market on time to avoid losses due to a declining market (bear market), are influenced by sweeteners, much like a sweet candy will appeal to a child whether in bad or good times (hence the name "sweeteners" or sugar-coated poison pill) (Iyer and Bhaskar 2002).

2) Participants will make more mistakes when in a "prey" position than when in a "predator" position (Starcke and Brand 2012).

We, of course, could not test our hypotheses during the GFC, as the crisis was long over when we conducted our research, but this was not necessary as we could use a proxy: scenario-building operationalized in highly-controlled conditions using dynamic systems modeling. We could not either directly measure the influence of sweeteners before, during, and immediately after the GFC, a constraint that would necessitate an extensive longitudinal study with many uncontrollable variables. We decided to focus on one key aspect of our sweetener framework – fear. We assumed this focus could help us develop our proposed framework (see Figures 2 and 3). Indeed, in scientific research, it has long been known that it is always better to keep the variables as controllable as possible in order to segregate the influence of each one on the target variable, including in the context of behavioral, decision-making research (Keinan 1987). This cannot be achieved in real-life events, especially not in the case of the GFC where millions of people across the U.S. participated in very diverse and volatile conditions. Fear is a fundamental piece of the puzzle, be it fear of not entering the booming market on time (greed) or fear of not exiting a collapsing market on time (perceived risk of debt trap). We thus decided to test whether fear would negatively alter decision-making. If indeed fear acts this way, we can hypothesize that sweeteners helped alleviate fear and thus contributed to the explosion of greed and the hiding of risk. More particularly, we tested whether the conditions we subjected the participants (university students) to would make them forget about their initial motivation, which was to earn money rather effort-free.

Basic Research Set-up

We set up a simple *f*MRI to test how fear (provoked by random appearances of snakes – see further below) influenced the objective of earning money fast (by collecting yellow circles in a maze in a one-hour experiment) and avoiding getting caught by a moving, fast-acting red triangle (which, when this occurs, would signify a loss). Thus, our proposed set up would test greed in the presence of risk aversion, given the presence of a sweetener (money to be earned at the end). Using a fear factor, we could distract and desensitize the target group of

students from the objective of their participation in our experiment, which was to earn money fast with relatively little effort. We thus designed a simple test that would provide approximations for bubble market conditions. We offered participants the opportunity to act as market agents, that is, as investors (a proxy for home buyers), in an environment in which they could earn or lose money in a series of established scenarios. They could adopt one of two positions: predator or prey. The predatory position was created by offering the opportunity to earn money by playing through a simple maze. The prey position was created by offering participants two scenarios. In the first, a red triangle chased the participant; if it caught him or her, he or she would lose money. The other scenario added images of a snake appearing randomly. Ahead of time, participants in this study were intentionally screened for their fear of snakes.

In order to see brain activation in the *f*MRI process, it was necessary to create stimuli. These were the various elements that triggered the participants' responses, including images of snakes. As participants had been pretested for their sensitivity towards snakes, the baseline scenario thus monitored how the participants engaged without images of this stimuli appearing. Another possible research method could have been to conduct the same tests but with participants exhibiting no sensitivity to images of snakes: given the high costs of *f*MRI imaging research, this would assume that all participants were comparable. As this was out of our financial means, we decided to reserve this option for future research.".

In short, we designed a simple investment environment for the purpose of obtaining images of the participants' brains using *f*MRI. If we could show that the selected participants made more mistakes when in a prey position than in a predator position, and if we could show that they made more mistakes when in a high-fear condition (random images of a threatening snake) than in a low-fear condition (no snake images), then it would make sense that the only means of fooling a participant into buying a risky asset would be by sweetening the offer. This purely exploratory research would indicate how market agents act in real life, when market bubbles imply greed (fear of not entering the market) and the hiding of risk (minimizing perceived risk of a debt trap). We conducted our study over one year. We recorded the neural activity of the participants when they were given the opportunity to earn money (catching a yellow circle in the maze specifically designed for the task) or when facing

the risk of losing money (being chased by a red triangle or by a red triangle accompanied by images of threatening snakes).

Research Assumptions

Our assumptions were as follows: Greedy participants would be measured by the number of yellow circles caught in the minimum amount of time, while displaying a maximum number of wall hits (indicating that they make many errors, which is an indication of fear). In this case, we expect the part of the brain dedicated to the emotions (amygdala) to be very active; the part of the brain dedicated to error detection (anterior cingulate cortex or ACC) to be relatively inactive; and the part of the brain dedicated to computation (prefrontal cortex, PFC) to be moderately active (last image in the Appendix). We assumed that wall hits would be significantly higher in high- compared to low-prey conditions (snake *versus* no snake), which occurred, and that cortisol levels (measuring stress) before and after would be relatively high. This holding true, we assumed that there would be a maximum of wall hits per unit of time when the participants would experience a high fear of being caught by the red triangle, that is, of not being able to escape. In this scenario, we would expect the ACC to be quite active.

It must be noted that we tested how participants were going to react in a simple financial context given a fear factor (image of the snake). As such, our experiment did not measure the fear of not entering a booming market on time to earn a quick profit nor did it test the fear of not exiting a crashing market that is likely to lead to personal and/or business bankruptcies. This would command an extensive, longitudinal study in a rather complex set up, something that was not necessary in the early phase of our discovery of the phenomenon of consumer financial spinning.

Location and Procedure

Our research took place in Canada[13] and followed a strict protocol; a research ethics certificate was obtained from a Canadian university. We recruited the students by placing a poster on the campus' boards; participants would receive C$ 50 to cover their travel expenses and C$ 30 for participating in the experiment. They would be briefed on the results in addition to receiving images of their brains. They would also receive a reward calculated by the difference between yellow circles caught and being caught by red triangles. We never specified the exact financial reward, but the advertisement we placed to recruit them specified it would be substantial. We waited for the participants to ask for it to see whether they had somehow lost track of their initial motivation of making money. Participants had to lie flat on their back on the scanner table for approximately one-half hour. They observed a maze through a set of mirrors. Many scholars have resorted to mazes in fear and decision-making evaluation (e.g., Mobbs *et al.* 2009). Our laboratory condition represented an extremely simplified market condition, one where we could minimize the number of uncontrollable variables. Participants could respond to the stimuli presented in the maze (catching a yellow circle or running away from a red triangle that was accompanied, at times, by random images of a snake) by handling a pad with their dominant hand. Catching a yellow circle would earn them money (up to a maximum initial allowance of C$ 70), while being caught by a red triangle would cause them to lose money (up to C$ 70). Thus, the participants faced the (moderate) fear of not making money (the amount of which we never disclosed) and the (more intense) fear of losing money in two sets of conditions – low threat with the red triangle or high threat with the red triangle joined by flashing snake images. In our study, the fear of snakes acted as a proxy for the fear associated with not entering a hot (bull) market on time (to earn money) or not exiting a crisis market (bearish) on time (to avoid losing money). As is well known in psychology, most people cannot explain why they have certain fears or phobias: they simply become aware of them as they are faced with the stimulus that generates

[13] The rental of the laboratory and hiring of the technician cost C$ 700 per hour, which explains in part why we restricted our exploratory study to a limited number of participants.

fear, be it spiders or height, for example. The organic reaction to fear is a basic living organism's reaction that entices the same physiological response (such as trembling, need to urinate, sweating, etc.), no matter what the stimulus is, and the use of *f*MRI to examine the brain's response to a fear-generating stimulus is common in neuropsychological research (Morris, Buchel, and Dolan 2001).

Participants

In total, nine females and ten males were chosen out of the 53 who initially showed interest. We selected them based on their fear of snakes, which we measured using the widely-used Snake Anxiety Questionnaire (SNAQ). We used images of snakes retrieved from the well-established International Affective Picture System (IAPS) database. Snakes have been used in many studies (e.g., Nili *et al.* 2010) because they tend to induce fear among both men and women (Kandel, Schwartz, and Jessell 2000). To be efficient, participants had to have moderate levels of snake phobia. We chose participants aged 18-25 because sensitivity or phobias are usually quite active at that age (Craske *et al*. 1995). Additionally, their income level was checked and proved to be low to moderate, so that they would be that much more excited by the possibility to earn money by simply participating in a harmless experiment. We opted not to tell participants they would be able to view their *f*MRI images at the conclusion of the experiment, in order to exclude the possibility of participation solely on that basis. Nineteen or twenty participants are a common number of participants in *f*MRI studies (e.g., Herwig *et al.* 2011), so we felt we had an appropriate representation of the general population within the limits of our exploratory research.

Equipment

We used the following equipment: (1) a Siemens Symphony *f*MRI Scanner; (2) Siemens headphones; (3) Cedrus touch pad with Lumina part 0TEC4008; (4) Cotton swabs (for cortisol measurement); (5) Siemens A35 software data recording; and (6) SPM-5 for data analysis. Functional MRI studies are powerful and provide neural evidence of consumer behaviors, especially with respect to measuring emotions and cognition (Vul *et al.* 2009). Of value to us, *f*MRI detects unconscious processes (Reimann *et al.* 2011), which is the main advantage of the present study; participants could not fake fear. Indeed, the emotional response time to animal-related stimuli is approximately 800 milliseconds (Côté and Bouchard 2005), not enough time to think.

Documents

The following documents were presented to each participant: (1) the posters; (2) a certificate of ethics; (3) the well-established fear-of-snake SNAK questionnaire (Klorman *et al.* 1974); (4) a consent form; (5) self-assessment STAI Y1 and Y2 questionnaires (Nili *et al*. 2010); (6) a confidentiality agreement; and (7) a debriefing questionnaire. Using a cotton swab, we collected saliva immediately before and immediately after the experiment for the detection of cortisol levels. These levels are a strong indicator of stress and of negative feelings (see McCullough *et al.* 2007). Indeed, cortisol is a steroid hormone generated by the action of the hypothalamus – the center of defensive and instrumental coping mechanisms in the brain – to deal with stress. Cortisol is known to increase vigilance in the face of danger.

Results and Discussion

The research led to notable findings.

First Finding: Spinning

We hypothesized that the participants would make more mistakes when in a "prey" position than when in a "predator" position (Starcke and Brand 2012). To evaluate this hypothesis, we measured the number of yellow circles collected in the maze, the time to collect them when in a predatory position (proxy for greed), and the number of wall hits (errors in trying to escape the red triangle in low- and high-fear conditions) – a proxy for the perceived risk of a debt trap[14] (See Appendix). Our main finding was that we had managed to create a spinning condition or something that looked like the concept of spinning. Indeed, at the end of the test, we met each participant and debriefed them at length. Although participants had been offered money for their scores on the test (by catching yellow circles and not being caught by red triangles), none of the participants in the end asked for a tally of gains (yellow circles caught) and losses (being caught by the red triangle) to claim their reward. This omission surprised us; we therefore extended the briefing in the expectation that the participants would claim their reward, but they never did so. We postulate that we had offered enough distractions to them (for example, the novelty of the test and the appearance of the snake) so that in the end, they forgot their initial motivation. We assumed this kind of mechanism occurred in the concept of consumer spinning as we define it.

Without claiming of generalization, our research, with evidence from brain scan analyses of our participants, shows that greed can be influenced with a "fear factor". Recall we had chosen participants based on their innate aversion of snakes. It appears that when this aversion was fostered to a certain degree, the participants eventually lost track of their initial objective and played the game for the mere sake of playing the game. The initial sweetener we offered (money to low-income students) was not strong enough to prevent them from deviating from their initial goal of making an easy income in the face of a fear stimulus linked to a snake image randomly appearing. This can possibly be turned the other way: if we had eliminated all possible "fear factors" from the experiment and generously rewarded the participants with, say, a bonus for achieving a high score (lots of yellow circles caught and

[14] We checked whether there was a fatigue effect but found none.

few opportunities to be caught by the red triangle), it is likely that they would have been even more eager to engage in the experiment, which would have translated into the *f*MRI images, as the reward center (for example) – the VTA or Ventral Tegmental Area – would have been strongly activated (D'Ardenne *et al*. 2008.) This suggests that marketing sweeteners can have a strong impact on consumers' behaviors and that spinning can be induced to a certain degree, at least in a portion of the population and given the right conditions.

A consumer/would-be investor spinning status seems maintained by the use of external motivators (sweeteners) that serve to inhibit internal motivators (e.g., the initial need that was supposed to be fulfilled), in particular by making consumers both fearless (they perceive no risks as these are hidden, for example through misleading advertisements or securitization) and resourceless (by stealthily increasing their debt load). This goes against the premises of Self-Determination Theory (SDT), which "broadly characterizes motivation as either intrinsic or extrinsic and suggests that regardless of the context, people have a fundamental need to feel in control of their own destiny and competent in exerting that control" (Drayer, Dwyer, and Shapiro 2019, p. 38). In the case of consumer spinning, consumers give up control and become oblivious as to who and/or what controls them. As such, perhaps consumer spinning could develop into a self-harming condition that could be potentially pathological. Certainly, the level of displayed violence that the media portray during purchasing frenzy, such as the infamous Wal-Mart Black Fridays (which has caused deaths in the U.S.), or the overcrowded parking lots at shopping malls during weekends, suggest that consumers may at times have lost the ability to enjoy their purchasing experience, their need to bond and their sense of satisfaction for fulfilling these needs (Lennon *et al.,* 2018).

Second Finding: Greed versus Risk Aversion

In addition to the first finding, we collected more information. Our second finding was that, indeed, participants experiencing high levels of greed (yellow circles condition) and low levels of perceived threat (despite high-stress conditions in which mean images of snakes appeared randomly), displayed an active amygdala, a relatively inactive anterior cingulate cortex (ACC), and a moderately active prefrontal cortex (PFC). In other words, the same

pattern occurs whether the condition relates to that of a predator (yellow circle) or that of prey (red triangle with snakes). We assume these participants were intellectually numbed to a certain degree and did not have the necessary coping mechanisms to deal with different scenarios. We also assume that they were greedy, but they disregarded risk; the ratio of greed to perceived risk was high. They would probably respond favorably to sweeteners that appealed to their emotions and dreams of grandeur but not much to their intellect.

Third Finding: Predator versus Prey Position

Our third finding was that participants in a prey position performed at 25% of their capacity when being prey *versus* when being a predator. They made more errors when in fear of being caught (proxy for debt trap) than when in fear of not making money (proxy for greed). If this finding applies in the marketplace and can be generalized to the GFC (something that deserves much more research), then sweeteners would have helped quite substantially to pacify the eager house buyers so that they would become greedier but less sensitive to the real risks associated with their investment decisions. We cannot be certain at this time, but it seems this investigation path is worth pursuing.

Fourth Finding: Stress

Our fourth finding was that participants with a lower cortisol level (fifteen percent) after the experiment made more decision errors (wall hits) than did participants with higher cortisol levels. In other words, their level of vigilance declined. Our results show that the anterior cingulate cortex (ACC), a brain structure linked to error detection (Cardinal *et al.* 2002), was significantly activated when adopting a prey position[15]. We do not know whether these cortisol levels are gender-related or stem from the fact that the participants felt relieved at having completed the experiment. However, one-half of the participants exhibited a change in cortisol levels, indicating some stress-related activity. Our fifth finding was that participants who were

[15] This activation is measured using family-wise error (FEW) equaling 0.001, with voxels at 100.

prompted that they were about to become prey (they were warned that the red triangle was coming) showed higher levels of vigilance. Putting this finding in the context of our sweetener framework and keeping in mind that the research carried out was exploratory, we can speculate that sweeteners may help reduce the level of vigilance of the prey (the buyers of predatory mortgages) and, perhaps, entice consumer financial spinning.

Finally, we noticed that a certain level of stress improved decision-making (fewer wall hits). However, as stress increased due to the presence of a higher perceived threat level (high-threat scenario with the snake images appearing randomly), the number of wall hits increased by 50 %. Under high stress, participants made significantly more errors. This outcome was not surprising; in the long term, researchers have found that under high levels of stress, the prefrontal cortex (PFC), which is involved in decision-making, suffers from dendritic reduction and retraction (Lupien *et al.* 2009). Inserting this finding into our framework, we speculate that it was to the best advantage of the market agents (credit lenders and predatory mortgage sellers) to numb their prey (the naive borrowers and buyers of predatory mortgages) with sweeteners to drive them towards the expected result – incentivizing them to buy, with the hope of turning a quick profit. Indeed, spinning is about consumers becoming desensitized to their initial motivation and risks and to simply keep spinning, that is, doing what they were doing and what other consumers were doing, without raising any questions or concerns.

Adapting the Results to Market Conditions

We conjecture that marketing-financial sweeteners helped blind consumers/investors in the face of risk and enticed them to seek more than they wanted and certainly more than they needed. By using sweeteners (sweet deals), lenders and sellers were perhaps able to create the contagion effect that fueled the booming market during the GFC in the U.S. Without sweeteners, it appears unlikely that buyers would have ignored the risks; at least, their greed would have been more moderated by the fear of falling into a debt trap. When the market started to go awry, consumers most likely made more errors than they normally would, thus possibly making their situation worse (Angie *et al*. 2011). It is not possible to measure the actual effect of sweeteners on behaviors for an event that took place ten years earlier.

However, if our framework holds true, it is likely that uncaring lenders and sellers use sweeteners of all kinds to numb their prey facing the risk of a debt trap and to encourage them to seek more than they need, thus nurturing greed. Predators-sellers have a keen interest in achieving such a result; the greedier the consumers and the more oblivious to risk they are, the more likely it is that they will buy without weighing the consequences of their actions. The more consumers-prey buy, the more the sellers make money. Sweetening is to their advantage.

The phenomenon of consumer financial spinning is concerning because of the characteristics of at least some of the consumers. They are not all spontaneously inclined to succumb to spinning tactics, but as mentioned, some are particularly prone to gullibility and longing for overconsumption. Academics promoting the consumer learning (CL) theory (Mehta, Rajiv, and Srinivasan 2004) or its revised CL version (Cleeren, van Heerde, and Dekimpe 2013) have recognized that consumers often fail to access the necessary information and instead focus on irrelevant parcels of data. They also point out that many households rely on basic or elementary economic concepts (van Rooij, Lusardi, and Alessie 2011). This makes it that much easier to fool them, that is, to distract them from their initial financial goals and to nurture their greed to the detriment of proper risk assessment, thus leading them towards an unsustainable debt trap.

Conclusion

We discussed a framework that attempts to unveil a hypothesized consumer behavior that we name "consumer (or borrower) financial spinning" and to explain how the use of marketing sweeteners (sweet deals) encouraged a contagion effect and fostered the development of the housing bubble market in the U.S. from 2000 to 2009. We used the GFC because it appeared to be one of many examples where we can reasonably speculate that spinning took place. Our framework opposes two facets of fear: when foraging (looking to fulfil their needs), consumers balance out the fear of missing an opportunity (the fear of not entering a hot market on time in hopes of making a quick profit) and the fear of a debt trap (perceived threat). In this framework, fear is at the heart of buyers' behaviors.

Contributions

The findings seem to support the hypothesis that U.S. consumers deployed high levels of greed and subdued their natural tendency to detect danger (of a debt trap) because they were fascinated to some degree by the various sweeteners presented to them: ease of credit, teaser rates and subprime mortgages, upgrades of the houses and buying incentives.

We presented an *f*MRI study in which most variables could be controlled (as opposed to a real case study where most variables would be uncontrolled, thus severely diluting any possible conclusions concerning the results). We used a highly sophisticated method; our results tend to show that prey in a high-fear condition make more mistakes than do those in a low-fear condition. We showed that participants with moderate use of their prefrontal cortex (PFC), little use of their anterior cingular cortex (ACC) and high use of their amygdala in both extreme conditions (predatory and high-fear prey conditions) could possibly represent a mass of buyers that got caught in a debt trap during the GFC. This finding would corroborate what many economists have said about buyers of predatory mortgages being irrational, uneducated, naive, and vulnerable. The study is a fruitful effort that suggests that tests in virtual reality could be a future path of exploration, combined with *f*MRI results.

The experiment was designed to distract the participants as much as possible while somewhat replicating some elements of decision-making in a pseudo-market condition augmented by a fear factor (the random image of the snake). We believe we may have identified an untapped consumer behavior in the form of consumer financial spinning, as the participants clearly lost track of their initial motivation and simply went with the flow. Our sweetener framework tends to be somewhat supported by an *f*MRI study within the limited parameters involved. We paralleled our findings with the phenomenon of a booming U.S. housing market and proposed that when the market balloons, greed overwhelms the fear of a debt trap. When markets experience bank runs and accelerating decline, the fear of a debt trap far exceeds greed. In the end, the ratio of greed to risk aversion remains a pivotal factor. In other words, the ratio of the fear not to enter the booming market at the right time to the fear of not exiting the collapsing market at the right time drives consumer behaviors. These behaviors are, we suggest, susceptible to being influenced by sweeteners. Sellers and lenders

coat their toxic products with what appeals to consumers, such as ease of credit or fancy borrowing terms in the form of teaser rates. In fact, sweeteners form sugar-coated poison pills. When this technique is used, we posit that it is possible to entice consumers to lose track of their initial consuming motivation and to simply keep spinning their wheel of misfortune, like hamsters spin their wheels cluelessly, being content with simply spinning and nothing else.

Regulatory Impacts

We posit that regulations must consider such phenomena or potential behavioral manipulation that would encourage consumers to spin, because in the end, high or uncontrollable household debt-to-disposable income has the potential to harm the entire economy, as was true in the U.S. during and immediately after the GFC. In our view, there is no denying that many customers may spend their weekends shopping for unneeded goods or else forget about why they think they need them. Perhaps this is indicative of a form of spinning behavior. Will consumers realize in the end that they may have lost track of the utility of their buying behavior? Perhaps, too, overconsumption, a behavioral phenomenon anchored deeply in some consumers' psyche, is indeed a reflection of excessive marketing efforts aimed at inducing spinning. After all, even if some consumers end up in a financial dead-end, there will be other customers filling in for the lost sales (Warren 2004). We pointed to sweeteners as motivators to enter a consumer spinning state, likely brought about by uncaring marketers and product (including financial products such as predatory mortgages) designers. The behavior that their outputs seem to generate resembles the type of run-around lawyers may give to adversarial parties by clogging the judicial system with endless motions, adamant excuses and procedural defects in order to have them waste their time, effort and money, hoping they will lose interest in their initial, primary motivation and/or the case itself.

Limitations and Opportunities for Further Research

Our research was conducted with a strict control on the variables of interest. Participants were carefully chosen for the potential of triggering fear in them while placing them in a

decision-making situation involving gains and losses. We did our study on 19 participants, which is a significant number in *f*MRI studies (because brain images can be compared against that of a database composed of hundreds of scanned images[16]). These participants were university students, not avid house buyers. Therefore, our study approximated the complexities inherent to markets where houses are treated as investment assets and macroeconomic forces (such as foreign debt, exchange rate, etc.) come into play. While our research was exploratory and examined an emerging concept of consumer/investor behavior in the financial sector, our observations nevertheless merit consideration because they imply that some consumers/investors/would-be investors are potentially manipulated in a predatory manner, that is, in a way that harms them while enriching a few, much like drug dealing. If, indeed, there are marketers out there that specifically design products and advertisement campaigns to lure consumers/investors into buying extravagantly products of significant financial value, this should be considered as a form of abuse on consumers' rights. We propose that further studies should investigate this, which, if tested and accepted, would denote the need for better consumer protection by means of new or tougher laws.

Figures 1 and 3 call for multiple studies, notably on the ratio of greed to risk aversion. This has relevance because the accumulated debt eventually becomes unsustainable debt and leads to many household traumas and market upheavals. We suggest taking each component of the model, elaborating workable hypotheses, and testing them across cultures. What if, for example, risk aversion (and greed) was different from one country to the next (as strongly suggested by the various works of Hofstede 1983)? Perhaps, also, the case of financial spinning incorporates some dissociative elements, as, according to our definition, it means that consumers have disconnected from their initial needs, objectives (which was to fulfil these needs), and preferences. Dissociation is a damming condition in the sense that it isolates individuals, and hence leaves them with even fewer resources, which means they become even more vulnerable. Those who somehow control their spinning state then have even more reason to rejoice. This, we suggest, may have been the case for a portion of the population during the GFC. Again, if it is the case that some uncaring marketers and financial product designers tap into this mental state to make it an enduring behavior, one that ultimately harms the

[16] Notably, at the Montréal Neurological Institute's Brain Images Center.

consumers, then there are reasons to be concerned. Subliminal marketing takes place in a form that has not been named so far.

Certainly, a study of the cunning use of sweeteners and a comparison between extrinsic and intrinsic sources of motivation could further develop the concept of consumer spinning, as is done with other kinds of studies in the field of consumer behavior (Poch and Martin 2015). As hypothesized, this may involve the use of external motivators (sweeteners) numbing consumers' internal and initial motivators. The role of risk hiding, which tends to reduce vigilance and fear (as a self-protective mechanism), and debt building, which reduces the consumers' overall resources (e.g., capacity to defend themselves by legal means), have important consequences. Turning consumers into buying machines does not serve the betterment of society, quite the contrary: it encourages waste of intellectual and physical resources. Casino gambling seems to fall within the description of consumer spinning, at least for some customers. Some older and solitary individuals spend hours simply looking at a screen with colored and noisy wheels that keep spinning. These individuals seem to have forgotten, after a while, their initial goal to find a source of distraction. Instead, they end up confining themselves into a boring, idle state, as if on life-support. They are mesmerized by the random winning of small sums of money that are certainly not enough to build a fortune, but enough to motivate them to stick to the treacherous, money-swallowing slot machines. These small amounts serve as sweeteners and create a near-like addiction. The exact mechanism of this well-known situation could be further investigated under the lenses of the concept of consumer spinning.

Our research did not address sociodemographic factors, but clearly a mass study on consumer spinning, done through observations in major retailers (such as Wal-Mart, for example) or questionnaires could reveal potential differences between men and women, people with different levels of literacy (including financial literacy), age and consumers' lifecycles, types of dwelling, and even religion (Buddhism, for example, does not promote overconsumption), or race. Hence, as evidenced from our previous comments, we suggest that future research on the topic of consumer spinning should consider ethical, legal, marketing, pedagogical, and psychological avenues.

This being said, we believe a longitudinal study (spread over weeks or months) taking place during the rise, the occurrence of a speculative bubble and its aftermath using what was learned in this working paper with respect to consumer financial spinning could enrich our understanding of this unique phenomenon. This study would not use *f*MRI techniques but rather techniques developed in the data percolation methodology, such as computer simulations and consensus circles (Mesly, 2015). This requires a team effort, proper timing, and generous funding.

When it comes to consumption, the societal choice is simple: encourage consumers to become responsible market agents, including in the financial world, or else sacrifice many of them on the altar of blind capitalism (overconsumption), thus reducing the overall purchasing power of the consumer market and saddling many of these consumers with a "convict ball" (the unsustainable debt) that will impinge on their health, social behaviors and capacity to contribute positively to their community. As discussed, encouraging financial literacy may not be enough or even desired by the consumers-prey: after all, should consumer spinning be a malignant undertow, a hidden truth that affects social consciousness, it is the way we govern our economy that must be reconsidered.

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U.S. Mortgage Bankers Association. https://www.mba.org/

U.S. Securities and Exchange Commission, www.sec.gov

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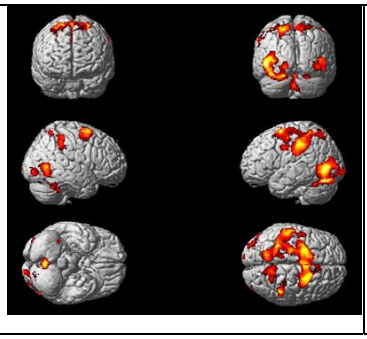
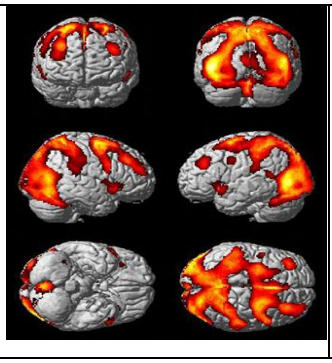
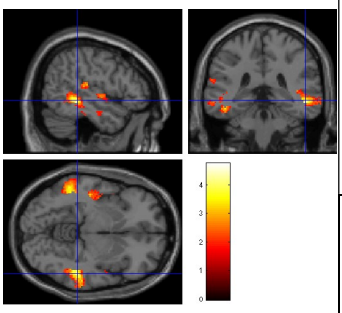
Appendix – Results



There is more activity when the participants are being chased (by a red triangle with or without random images of a snake) than when they do the chasing (catching the yellow circle). Hence, we posit that the basic motivation is fear.

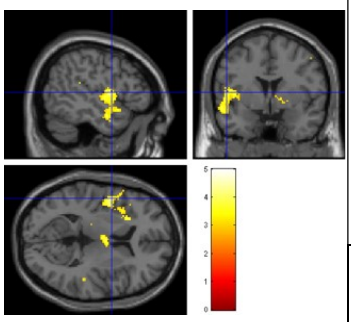


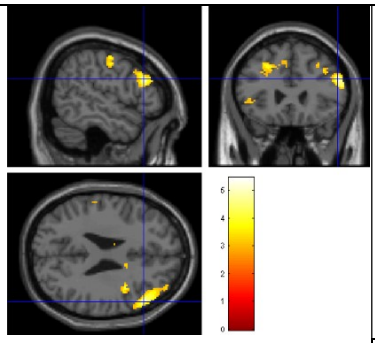
There is more brain activity when the participants cannot identify the predator – the snake in this instance (that is, when only the red square is chasing them). Knowing that the predator is a snake reduces the ambiguity.



Seed region 0.005	Negative Connectivity
Left hypothalamus	-44 -26 -14 Left superior temporal gyrus

When perceived predation increases with images of snakes appearing randomly, brain functions indirectly related to emotions and language diminish

	Seed region 0.005	Negative connectivity
	Left amygdala	-50 2 8 left rolandic operculum ACC -44 24 2 right inferior frontal gyrus -6 -4 6 right thalamus
	When emotions increase due to the surprise appearance of the snake, language, consciousness of self and of the environment, and the capacity to make decisions (including risky decisions) diminish.	

	Seed region 0.005	Negative connectivity
	Right amygdala	54 26 26 right inferior frontal gyrus dorsolateral prefrontal cortex 4 2 6 basal ganglia
	When emotions increase due to the surprise effect created by the random appearance of the snake, cognitive and decision capabilities diminish.	