

# **Motivational Dynamics in Language Learning**

Edited by

**Zoltán Dörnyei, Peter D. MacIntyre  
and Alastair Henry**

**MULTILINGUAL MATTERS**

Bristol • Buffalo • Toronto

### **Library of Congress Cataloging in Publication Data**

Motivational Dynamics in Language Learning/Edited by Zoltán Dörnyei, Peter D. MacIntyre and Alastair Henry.

Second Language Acquisition: 81

Includes bibliographical references.

1. Second language acquisition. 2. Motivation in education. 3. Identity (Psychology) 4. Self. I. Dörnyei, Zoltán, editor. II. MacIntyre, Peter D., 1965- editor. III. Henry, Alastair. P118.2.M677 2014

418.0071-dc23 2014019602

### **British Library Cataloguing in Publication Data**

A catalogue entry for this book is available from the British Library.

ISBN-13: 978-1-78309-256-7 (hbk)

ISBN-13: 978-1-78309-255-0 (pbk)

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Typeset by Techset Composition India(P) Ltd., Bangalore and Chennai, India.

Printed and bound in Great Britain by Short Run Press Ltd.

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# 7 Human Agency: Does the Beach Ball Have Free Will?

Ali H. Al-Hoorie

The fundamental difference between the hard sciences and the social sciences may not lie in the complexity of the latter, since it is possible to conceive of immensely complex situations in the hard sciences as well. Instead, the uniqueness of the social sciences might lie in people's ability to choose how to behave. Particles and molecules do not make choices, as their behaviour is predetermined and predictable by physical and chemical laws. That such precise predictability is absent in human behaviour is a strong argument for our ability to exercise free will through rational thought. In fact, it is the human ability to think and make rational choices that underlies ethical and moral judgments, for example deeming humans worthy of praise and reward for good behaviour, and answerable for wrongdoing.

As intuitive as it might be, the above reasoning has not gone unchallenged over the years. On the one hand, advances in quantum mechanics show that precise prediction is not possible *even in principle*. The position and the momentum of a particle, for example, cannot be precisely determined simultaneously; the more precisely one is known, the less precisely the other can be determined. On the other hand, several studies have questioned the extent to which humans are in control of their actions and thoughts. As a preliminary illustration, one of the most striking findings in this respect has come from neuroscience, where one study found that the outcome of a decision could be detected in brain activity up to ten seconds before it entered awareness, suggesting that it might be possible to predict people's behaviour prior to their conscious decision to behave (Soon *et al.*, 2008). Findings in a number of different theoretical and research paradigms have pointed to similar conclusions, leading some scholars to view our free will as a mere illusion (e.g. Wegner, 2002) and our behaviour as largely determined by unconscious, automatic processes, not by our conscious deliberation (e.g. Bargh & Williams, 2006). Other researchers have attempted to combine quantum indeterminacy with social sciences to account for human free will

(Glimcher, 2005; Kane, 1996). The applicability of insights from quantum mechanics to our behaviour is, however, disputed (Juarrero, 1999; Lau, 2009; Nahmias, 2010).

Regarding the main theme of the current edited volume, a recent approach to understanding human behaviour has turned to complexity theory to find explanations for human behaviour (*cf.* Larsen-Freeman & Cameron, 2008). Complexity theory raises interesting questions regarding agency and whether the individual is capable of exercising free will by choosing how to behave. This is because one of the most common metaphors in complexity nomenclature is 'the beach ball', which suggests that the behaviour of the individual tends to be a function of the terrain and its attractors, thus controlled by external factors; the beach ball does not have free will. Because multiple, combined and integrated forces constantly affect behaviour, making it almost never in equilibrium, it is easy to overlook the 'agent' and whether one can be in charge of his/her own behaviour. This reinforces the beach-ball view of the individual. Although most complexity theorists may not consciously embrace such a deterministic view, clearly this question has not received due attention. However, when we intend to apply complexity theory to human motivation, it becomes a crucial issue to examine whether the beach ball can have a will of its own. Can the beach ball, for example, make a decision to go against the flow?

Looking at the literature in general, scholars tend to agree on general principles on the relationship between the individual and the environment; beyond that the issue is 'oddly divisive' (Dörnyei, 2009: 236). Within complexity theory in particular, Larsen-Freeman and Cameron (2008: 76) conclude that 'it remains to some extent an open question as to how far complexity theory can accommodate deliberate decision-making'. Indeed, complexity theory has made substantial strides in analysing the terrain of the system and its attractors, with much more work to be done to consider the extent to which behaviour is governed by the various system parameters and attractors. After all, the ultimate goal is not merely to describe the terrain features but to understand their effect on behaviour. In Albert Bandura's (1997: 7) words, 'Agency causation involves the ability to behave differently from what environmental forces dictate rather than inevitably yield to them'.

The question of human agency and free will has been the subject of bitter debates and sharp disputes, stimulating the thought of intellectuals belonging to diverse disciplines including Albert Einstein, Samuel Johnson, Immanuel Kant, John Stuart Mill, Jean-Paul Sartre and Percy Bysshe Shelley. This chapter builds on Larsen-Freeman and Cameron's (2008) discussion of this subject by presenting an overview of a number of theoretical paradigms that have challenged the independence of human agency, followed by a summary of the main arguments used by agency proponents to respond to these challenges.

## Agency Under Attack

### Early challenges

The first attempt to strip from humans the agency of their rational thought is represented in the *psychodynamic paradigm*. Sigmund Freud was the first scientist to offer a systematic analysis of unconscious motives and to conclude that the conflict between conscious and unconscious is not exclusive to those suffering from mental illness, but a general structure of the human mind, and that only a minority of our actions are based on rational thought (*cf.* Rennison, 2001). Many critics disapproved of Freud's theory because it was considered an 'insult' to deeply held beliefs about the self and reason, a standpoint that Freud himself acknowledged, but interpreted as 'resistance' and another defence mechanism not to accept this embarrassing truth (Robinson, 1993). According to the psychodynamic view, our conscious mind is only the tip of the iceberg, and our behaviour is primarily motivated by early childhood experiences that lead to an unconscious battle between the id, ego and super-ego, a battle fuelled by the pleasure, the reality and later the death principles (Heller, 2005; Thurschwell, 2000). It is worth noting, though, that at the heart of the psychodynamic paradigm is the fundamental assumption that we *can* exercise control over our behaviour, albeit indirectly, through the tools of psychoanalysis, such as studying dreams, free associations and Freudian slips (Sherman, 2000).

Psychoanalysis was replaced by the positivist empiricism of the *behaviouristic paradigm*. Following David Hume's (1921/1748) emphasis on the external nature of constant conjunction, Watson's methodological behaviourism rejected inner life because it is not directly observable and requires the unreliable method of introspection (Watson, 1913). B.F. Skinner's radical behaviourism went one step further by contending that the mind was no more than an imaginary invention, like all cognitive constructs, such as thinking, intention and knowledge (Skinner, 1961). Our phenomenological feelings were interpreted as 'collateral effects of the causes' (Skinner, 1989: 18), mere by-products of three kinds of selection by consequences: natural selection (genes), operant conditioning (reinforcement) and the social environment (Skinner, 1981). In his reply to Chomsky's (1959) review of *Verbal Behavior* (Skinner, 1957), Skinner (1972) claimed that creativity, whether in generative grammar or in poetry, is no more remarkable or less inevitable than a hen laying an egg!<sup>1</sup> The belief that humans control their behaviour was compared with the belief that the wind controls its movement or that the farmer controls which type of fruit the plant will produce (Skinner, 1978). Skinner opposed the agentic mind so forcefully that in a speech just one day before his death he equated the effect of cognitive science on psychology with that of creationism on science (Skinner, 1990). Skinner accepted all corollaries of

his position, rejecting free will, punishment for transgressions and even human dignity (Skinner, 1973).

## Modern challenges

Today, the assumptions of Freud and Skinner that challenge our agency still persist in various guises. One is the *behaviour genetic paradigm*, first systematically utilized in 1875 by Sir Francis Galton (Burbridge, 2001). The most powerful design to extract genetic influences is ‘twins-reared-apart’ comparisons, limitations of which are compensated for by ‘adoptees-reared-together’ comparisons to examine environmental effects in the absence of genetic similarity and by non-human selective breeding to allow for randomization (Plomin, 1990; Plomin *et al.*, 2001). In 1979, the Minnesota Study of Identical Twins Reared Apart was initiated (see Segal, 2012) and found that ‘genetic variation is an important feature of virtually every human psychological trait’ (Bouchard, 2008: 69). To cite just a few figures, according to Bouchard (2004), heredity accounts for a substantial proportion of the variation in key human attributes, such as mental ability (around 80%), personality (40%–50%), psychological interests (36%) and social attitudes (65% for males and 45% for females), while environmental influences play a far smaller role, sometimes even decreasing with age. Although genetic influences do not usually account for more than 50% of the variance (Plomin, 1990), this magnitude is still remarkable considering that it constitutes a *single source* (Bouchard & McGue, 2003), thus leaving all other influences to share the remaining variance. These results support Skinner’s argument that a substantial proportion of our behaviour is shaped by natural selection.

Further support to Skinner’s theory comes from the *social paradigm*, specifically from the structure vs. agency debate in sociology. In one extreme, Emile Durkheim (Durkheim & Lukes, 1982/1895) challenged Karl Marx’s philosophy and advocated the structuralist position that views human behaviour as passively and unidirectionally determined by social structure. The other extreme, the voluntarist position, shifts the focus to the individual, construing social structure as a result of human’s purposeful autonomy, a position held by Max Weber (Weber *et al.*, 1978/1922) and recently by Baert and da Silva (2010). A compromise between these two extremes was later reached in Anthony Giddens’s (1984) structuration theory and Pierre Bourdieu’s (1977/1972) theory of practice. This position sees structure and agency as having a dialectical relationship in an iterative process where the system is ‘recursively organized’ (Giddens, 1984: 25). In this duality of structure, agents act reflexively to three sources of constraint (and enablement) represented in ability limitations, sanctions by powerful others and structural contexts that limit the agent’s options. To draw an analogy, football players are constrained by rules, but these rules also give players the freedom to compete in a fair game that does not descend into complete anarchy.

Some sociocultural theorists in the second language (L2) field have expressed similar views (e.g. Duff, 2012; Lantolf & Thorne, 2006; van Lier, 2013), while others adopted a realist position (Gao, 2010; Sealey & Carter, 2004) arguing that agency and structure are independent and that their interaction produces emergent properties. Social psychologists working within Henri Tajfel and his student John Turner's social identity theory (Tajfel & Turner, 1986) have similarly demonstrated that group affiliation has a significant impact on a wide range of issues, including stereotyping and prejudice (Brown, 2010), crowd behaviour (Reicher, 2001), attitude and attitude change (Crano & Prislin, 2008), judgment and conformity (Jetten & Hornsey, 2012) and group motivation (Hogg & Abrams, 1993; Hogg *et al.*, 2004). In addition to structure and agency, psychologist Albert Bandura (1986) adds a third component in his triadic reciprocal causation model, namely behaviour. In addition to influencing the environment, behaviour, once it has occurred can, in turn, have an influence back on the individual. Even the story influences the storyteller (McAdams & Pals, 2006).

In other words, 'there is no chance that ... [our decisions] can be disconnected from the social-political-historical-moral-cultural influences of our time' (Larsen-Freeman & Cameron, 2008: 76). That one has to constantly navigate through all these influences indicates that human agency cannot be understood by looking into the individual, but, paradoxically, by looking into the social context (Dreier, 2008), as individuals cannot be completely autonomous (Ahearn, 2001). In fact, 'conditioning' is still accepted as an explanation of environmental effects by some sociologists (see Archer, 2000) and social psychologists (Bohner & Dickel, 2011), while frequency of stimulus is seen as a key determinant of L2 acquisition at all levels of analysis, including phonology, morphology, syntax, discourse and orthography (Ellis, 2002). This magnitude of environmental effects lends support to Skinner's argument that a large extent of our behaviour is shaped by the environment.

In the 1950s, the cognitive revolution supplanted behaviourism (Miller, 2003). The *cognitive paradigm* was largely inspired by Edward Chace Tolman's (1951/1932) purposive behaviourism and was a major step in reinstating the role of mental life in human behaviour. Cognitive psychology has subsequently split into two routes: the microanalysis of brain functions and the macroanalysis of the socially situated individual's goals, expectations and aspirations (Bandura, 2001). Proponents of both of these research avenues agree that, contrary to behaviourism, external stimuli do not influence the individual *directly*, but through how they are consciously perceived, thus restoring the individual's role in the causal chain. However, new strands within cognitive psychology have started to challenge this view. Originally, Thomas Henry Huxley (2011/1894) proposed the 'steam whistle hypothesis', wherein behaviour is caused by molecular changes in the brain while consciousness<sup>2</sup> is a by-product without a causal effect. Replacing 'conditioning' with 'automaticity', but accepting internal processes, advocates of this

view explicitly state that they have ‘reopened the behaviorists’ hypothesis that the higher order responses of the human being can be *directly* put in motion by environmental stimuli’ (Bargh & Ferguson, 2000: 928; emphasis added). Empirical studies, utilizing conscious and unconscious priming techniques (for methodological reviews, see Bargh & Chartrand, 2000; Neely, 1991), have confirmed that situational contexts have significant unintended effects:

- cognitively – information-processing goals can be primed (e.g. memorise vs. evaluate; Chartrand & Bargh, 1996);
- affectively – primes influence enjoyment and self-determination (i.e. intrinsic vs. extrinsic; Séguin Lévesque, 1999), attitudes towards goals (Ferguson & Bargh, 2004), goal-facilitating objects (Ferguson, 2008) and goal-facilitating people (Fitzsimons & Shah, 2009), as well as affect following success and failure (Moore *et al.*, 2011) and emotion regulation during anger provocation (Mauss *et al.*, 2007);
- behaviourally – priming increases the probability of goal pursuit and effort exertion (Aarts *et al.*, 2008; Holland *et al.*, 2009) and of resumption after interruption and persistence after setbacks (Bargh *et al.*, 2001);
- socially – automaticity extends to behavioural contagion (Chartrand & Bargh, 1999) and even moral judgment (Agerström & Björklund, 2009).

These unconscious effects can be activated by things as simple as chair softness (Ackerman *et al.*, 2010) or coffee temperature (Williams & Bargh, 2008). They also occur through the same brain regions (Pessiglione *et al.*, 2007) and working memory capacity (Hassin, 2008) as conscious effects.

In sum, automaticity is seen as ‘a staple and indispensable construct for the explanation and prediction of almost all psychological phenomena’ (Bargh *et al.*, 2012: 593), accounting for 99.44% of behaviour (Bargh, 1997: 243), while consciousness has ‘no role’ (Dijksterhuis *et al.*, 2007: 52) and ‘has been vastly overrated; instead, it is often a post-hoc explanation of responses that emanated from the adaptive unconscious’ (Wilson, 2002: 107). What about our phenomenological feeling of agency? These scholars consider self-knowledge a poor, unreliable measure, citing studies on confabulation, choice blindness and misattribution of agency (e.g. Bar-Anan *et al.*, 2010; Hall *et al.*, 2010; Johansson *et al.*, 2005; Wegner, 2002). The magnitude of empirical evidence supporting the effect of unconscious processes on behaviour left some wondering whether Freud is really dead (Westen, 1999) and whether the cognitive revolution would just be a detour to behaviourism (Mischel, 1997).

Our exercise of agency has further been challenged by other paradigms as well. For example, random events are said to ‘rule our lives’ (Mlodinow, 2008), where accidental occurrences can become life-changing occasions. Our free will is also constrained by hormones and other biological factors, such as the effect of testosterone level on generosity (Zak *et al.*, 2009) and social dominance (Terburg *et al.*, 2012), or the impact of diet on depression

(Akbaraly *et al.*, 2009; Sánchez-Villegas *et al.*, 2009) and on cognitive ability in childhood (von Stumm, 2012) and adulthood (Kesse-Guyot *et al.*, 2012). The effects in all of these cases operate below the threshold of consciousness, and therefore we are unable to control them directly. However, as discussed below, some scholars argue that we can still exert indirect, second-order control (Bandura, 2008) by learning about these effects and behaving adaptively. Researching these issues is therefore an instance of exercising agency.

## Neuroscientific confirmation

A recent, powerful confirmation to the arguments against direct agency comes from the *neuroscientific paradigm*. Initially, German researchers Hans H. Kornhuber and Lüder Deecke (1965) discovered that voluntary action is preceded by bio-electrical activation in the brain, which they termed *Bereitschaftspotential*, or readiness potential (RP). This finding did not seem particularly remarkable until 20 years later when Benjamin Libet and colleagues (1983) found ‘somewhat puzzlingly’ (Larsen-Freeman & Cameron, 2008: 76) that RP precedes even the conscious intention to act. They concluded that ‘voluntary’ action is actually initiated unconsciously. Threatening as it is to free will, this conclusion attracted severe criticism on methodological (Klemm, 2010) and philosophical (Dennett, 2004; Mele, 2009) grounds. Experiments also questioned whether RP represents a decision to act (Trevena & Miller, 2010) and whether introspection is a reliable measure of decision time (Banks & Isham, 2009). Nonetheless, more refined replications confirmed the original findings (Haggard & Eimer, 1999; Matsushashi & Hallett, 2008). Other studies predicted which hand the participant would move 10 seconds before this decision enters awareness (Soon *et al.*, 2008) and used direct recordings from single neurons with more than 80% predictive accuracy (Fried *et al.*, 2011), the latter being the most accurate approach in contemporary neuroscience (Haggard, 2011). In all of these cases, the participants’ decisions were predicted before the participants themselves were aware they would make those decisions, leading some to conclude that we confuse correlation with causation in the relationship between our sense of agency and our actions (Wegner, 2002), and that full awareness of agency may even be ‘postdicted’ by the individual *after* action has been unconsciously initiated (Guggisberg *et al.*, 2008). Neuroscientist John-Dylan Haynes wonders, ‘How can I call a will “mine” if I don’t even know when it occurred and what it has decided to do?’ (cited by Smith, 2011: 24). Further, transcranial magnetic stimulation can induce participants, unbeknownst to them, to choose which hand to move (Ammon & Gandevia, 1990) and, recently, this non-invasive brain stimulation was found to improve numerical competence (Cohen Kadosh *et al.*, 2010) and other arithmetic skills (Snowball *et al.*, 2013) with effects observed as long as six months later!

On the negative side, disruption to brain functions can have unwanted behavioural consequences. In addition to the famous Phineas Gage, whose

personality reportedly changed after a freak accident that destroyed part of his brain (see Fleischman, 2002; Macmillan, 2000), brain tumours have been blamed for criminal behaviour, such as indecent conduct (Goldberg, 2001) and paedophilia (Burns & Swerdlow, 2003; see also Mobbs *et al.*, 2009), as well as more extreme disorders, such as the alien hand syndrome (e.g. Assal *et al.*, 2007). These findings raise the question of whether our behaviour is controlled unconsciously by our neurons. Yet, it is argued, we can exercise agency through consciously ‘vetoing’ the execution of impulses initiated unconsciously (Libet, 2003, 2004; though see Lau, 2009) by implementing a ‘neural brake’ mechanism (Filevich *et al.*, 2012). Furthermore, this process, dubbed ‘free won’t’, is not the only function of consciousness, because consciousness is an emergent property that also exerts top-down influence, complementing the unconscious bottom-up influence (Bandura, 2008; Gazzaniga, 2012). Finally, this counterargument assumes that the unconscious initiation of action discovered by Libet is generalizable from the simple finger movement examined in those laboratory studies to all human behaviour, and cannot be explained away by skill automation (Bandura, 2008).

## Agency Fights Back

The previous sections have presented in some detail a range of powerful arguments and positions that go against the grain of traditional motivation research by claiming that the antecedent of human behaviour is not ‘motivation’ conceived as an attribute of which people are always aware. We have seen some potential counterarguments, and in the following such arguments will be further explored in an attempt to suggest some possible interim positions. Generally, those who adopt pro-agency views argue that the agent, given the same present situation and the same past events, ‘could have done otherwise’. They are usually open to accept that certain factors may play a role in our behavioural choices, but maintain that these factors merely *influence* them, as opposed to *entirely produce* them (Nichols, 2008). ‘Your genes, your upbringing, and your circumstances may predispose certain behaviour tendencies. But ultimately it is you who decides and who bears responsibility’ (Myers, 2008: 32–33).

In an attempt to address the issue of agency head on, Baumeister *et al.* (2011) embarked on the task of answering what at first seems an obvious question: do conscious thoughts cause behaviour? In order to establish causality, these scholars reviewed various carefully selected lines of research that involve random assignment to experimental manipulations, such as imagining, mental practice, implementation intentions and anticipation. In support of the agency view, their results showed that conscious causation of behaviour is ‘profound, extensive, adaptive, multifaceted, and empirically

strong' (Baumeister *et al.*, 2011: 351). Agency proponents will certainly be delighted by this conclusion, but the disparity between this pro-agency conclusion and the wide range of anti-agency findings outlined above raises several questions.

First of all, these two viewpoints need to be reconciled. In their article, Baumeister *et al.* (2011) realised that the role of conscious thought is not as direct as might be intuitively assumed, but offline and indirect: 'Nothing indicated motivations *originating* in consciousness – instead, conscious thoughts interacted with existing motivations' (Baumeister *et al.*, 2011: 351, emphasis added). Put differently, in many situations, our agency seems to be represented not in our direct control of behaviour, but in our ability to resist an unconscious impulse or to select from multiple competing impulses. These resistant and selective roles of conscious behaviour still affirm our agency, and by extension our moral responsibility, albeit in an indirect fashion (*cf.* Juarrero, 1999; Larsen-Freeman & Cameron, 2008). This indirect view of agency supports a duality within human nature; while on the one hand the terrain with its multiple influences disposes behaviour towards one direction, on the other hand agentic behaviour requires conscious evaluation of these tendencies and vetoing what is deemed maladaptive.

The second question raised by the disparity of the agency-related findings is how consciousness can exercise its agentic role. That is, even if we accept the mediating influence of consciousness, we still need to explain the mechanism by which this agentic capacity is achieved. As Bargh and Ferguson (2000) argue, construing consciousness as an 'uncaused cause' reverts to a Cartesian dualism, which maintains that the mind is a non-physical entity (e.g. a soul) that is excluded from the causal order governing the body; in order to study consciousness scientifically, we must presuppose that it follows the physical laws of our universe. Complexity theory offers one solution that explains conscious free will without violating physical laws. Philosopher Alicia Juarrero (1999) maintains that modern philosophy is based on Aristotle's (mistaken) contention that cause must be external to its effect. Instead, Juarrero asserts that an alternative to external cause is 'self-cause'. That is, complex systems allow emergent properties, and these properties can have qualitatively different functions. Consciousness is seen as an emergent property that exerts top-down control on behaviour.

The third question concerns who can have this agentic ability. Is everybody capable of it? There seem to be at least two essential prerequisites. The first prerequisite is that one needs to believe in free will (Csikszentmihalyi, 2006). For example, research suggests that belief in determinism can lead to unethical behaviour through yielding to enticement (Vohs & Schooler, 2008). Contrary to philosophers who are interested in the abstract concept of free will and its existence, Dweck and Molden (2008) also argue that what people believe constitutes a psychological question whose answers construct differential psychological realities. This is because the laws of our universe

referred to above also include human nature and how people view themselves, and this is at least partly self-constructed. To support their view, Dweck and Molden (2008) review diverse lines of research showing that self-theories – as fixed or malleable – have a direct and unequivocal effect on behaviour, attitudes and motivation. They conclude that ‘personality is, in many ways, a highly dynamic system in which (changeable) beliefs can create a network of motivation and action’ (Dweck & Molden, 2008: 58) and that ‘people’s self-theories have a cascade of effects on their personal motivation, as well as on the ways they judge and treat others’ (Dweck & Molden, 2008: 47).

The second prerequisite is that agentic capacity requires becoming cognisant of the factors that influence one’s behaviour. Awareness of the effects of unconscious primes may override and disrupt unconscious impulses (Bargh & Chartrand, 2000; Wegner & Bargh, 1998). Group affiliation, for example, may lead to prejudice automatically, but the realisation of this susceptibility would help one monitor one’s behaviour and hopefully avoid the prejudice trap. People may shape their own destiny by learning about the factors that influence them. Agentic exercise of conscious thought can thus have a causal impact on behaviour (for a review, see Baumeister *et al.*, 2011) and, therefore, it is a false dichotomy to ask whether conscious or unconscious thought causes behaviour; it is the interplay between the two (Baumeister & Masicampo, 2010; Nordgren *et al.*, 2011). For this reason, psychological experiments typically involve an element of deception for fear of nullifying the independent variables under examination; allowing the participants to be conscious of the actual hypothesis prior to the study is considered ‘a scientific prohibition’ (Bandura, 2007: 655). Even covert, nonverbal communication from the experimenter can bias the participants’ performance (Rosenthal, 2003).

In other words, the emergent nature of consciousness seems to allow one to exercise agency by recycling and reprocessing one’s knowledge of the system in order to reshape the boundaries of the system and change its trajectory. This illustrates the nonlinearity of the system; the same situational input (the terrain) can have divergent outputs depending on one’s expertise and attentiveness to input particulars. This conceptualisation is compatible with the First Law of Thermodynamics (*cf.* Juarrero, 1999), which states that energy is always conserved, cannot be created or destroyed, and can only be converted from one form into another. That is, consciousness does not have to be an uncaused cause, but a reorganisation of existing knowledge. Fate, we may argue, is not dictated by the terrain, but by whether one resists, or yields to, it. In fact, it is probably this capacity to resist attractive attractors that makes humans unique. If our behaviour were solely a product of the terrain, looking back and feeling proud about one’s achievements would become meaningless.

An example of this agentic achievement should make the point clearer. A vivid illustration comes from research on psychological resilience.

Resilience is defined as ‘the maintenance of positive adaptation by individuals despite experiences of significant adversity’ (Luthar *et al.*, 2000: 543). That is, some individuals are able to sustain normal functioning in situations of extreme stress, significant threat, severe adversity and trauma (Cicchetti, 2010), and can actually thrive after these aversive events (Bonanno, 2004). Such cases might be more interesting than cases where an individual follows the expected trajectory by succumbing to a negative attractor basin and consequently developing, say, mental disorders or other psychopathologies. Initially, theorists assumed that such cases are exceptional, but recent empirical studies have shown that resilience is actually *the most common* response to potential trauma (Bonanno, 2005). Although it might be tempting to think of resilience as an individual difference trait, resilience researchers have forcefully challenged such a view. These researchers argue that resilience is not ‘in’ the person (Masten, 2012: 208) or something that an individual ‘has’ (Cicchetti, 2010: 146). Instead, they stress that resilience emerges from the dynamic interaction of multiple factors, internal and external to the individual, that have differential effects depending on time and context.

Furthermore, like in so many other areas, researchers have been able to discover specific genes that appear associated with resilience. Kendler (2006) argues, however, that the expression ‘X is a gene for Y’ is misleading, because it implies a causal relationship that is strong, clear and direct, while in fact genes play a contributory role working in concert with a host of other factors. Indeed, recent findings dispute the direct causal role of genes suggesting that:

there is much more scope for a single gene to have multiple diverse actions. But, even more basically, this dynamic process forces one to reconceptualize just what is meant by a gene. These new findings in no way undermine the evidence of the crucial pervasive importance of genes but they do undermine any notion that genes are determinative in a simplistic fashion ... (Rutter, 2006: 151)

## Conclusion

Going back to the original question of whether the beach ball has free will, the above overview is consistent with Larsen-Freeman and Cameron’s (2008: 76) assertion that ‘we can marshal some substantial support for a positive answer to this question’ and with Juarrero’s conclusion that ‘We are not passive products of either the environment or external forces. In a very real sense *we* contribute to the circumstances that will constrain us later on’ (Juarrero, 1999: 253, emphasis added). This position is moderately optimistic as it rejects both the extreme view that we have absolute control over our behaviour, and the other extreme that our behaviour is entirely ruled by

unconscious processes and external factors. Although past research has confirmed several behaviourist claims, investigations also point to our ability to exercise agency indirectly through top-down control (e.g. Baumeister *et al.*, 2011; Windmann, 2005). This conclusion, however, also compels us to make an important distinction between the beach ball and the individual in relation to attractors. While the ball gravitates towards various attractors, individuals can agentially repel themselves from certain others. As demonstrated in resilience research, this ironic process – repelling from attractors – is not uncommon and requires ordinary rather than extraordinary abilities, hence its nickname ‘ordinary magic’ (Masten, 2001). Motivational theorising within a complexity framework has paid little attention to this repellent process to date and has instead focused on the expected trajectory of individuals gravitating towards attractors. However, potentially introducing agency into the genes–environment debate, conscious repellent processes certainly deserve more attention in future research.

## Acknowledgements

I would like to thank Zoltán Dörnyei for his extensive discussion and feedback on this topic. I also thank Diane Larsen-Freeman, Peter MacIntyre and William C. Peterson for their comments on an earlier draft.

## Notes

- (1) In explaining his late reply, Skinner (1972: 345–346) stated, ‘Let me tell you about Chomsky. I published *Verbal Behavior* in 1957. In 1958 I received a 55-page typewritten review by someone I had never heard of named Noam Chomsky. I read half a dozen pages, saw that it missed the point of my book, and went no further. In 1959, I received a reprint from the journal *Language*. It was the review I had seen, now reduced to 32 pages in type, and again I put it aside. But then, of course, Chomsky’s star began to rise’.
- (2) Although they are not strictly the same, consciousness and rational thinking are treated in the same way in this context.

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