

# The proof of the pudding: A series of applied tests of the implications of research on embodiment

Lois Sanborn<sup>1</sup> and Steve Bennett<sup>1</sup>

<sup>1</sup> - Institute for Generating Novel Outcomes Based on Embodied Language, University of Springfield

## INTRODUCTION

Calls have been made for psychologists to step up to the plate and deliver on the promise of their theories with practical products (e.g., [Banyard 2015](#)). In the present article we report on the work of a recently-established translational research institute designed to generate just such practical outcomes: the Institute for Generating Novel Outcomes Based on Embodied Language (IGNOBEL). The impetus for IGNOBEL comes from a recent offshoot of work on embodied cognition that demonstrates that enacting idioms can produce their figurative associations (e.g., literally *smelling something fishy* increases levels of suspicion; [Lee & Schwarz 2012](#)). The aim of the institute is to take this insight out of the lab and prove its value in everyday settings, and here we outline a number of ways that we believe this can be achieved. But first, we present a brief theoretical background for those unfamiliar with work on the embodiment of metaphor.

## EMBODIMENT IN LANGUAGE: NOT ALL METAPHORS ARE MERELY METAPHORICAL

Embodied cognition refers to the idea that our thinking is shaped by our corporeal nature ([Glenberg et al. 2013](#)). Many thus believe that our understanding of even high-level, abstract concepts is grounded in our more concrete bodily experiences ([Meier et al. 2012](#)), and that commonly-used metaphors accurately represent these abstract-concrete connections. For example, we often describe an emotionally close

relationship as *warm* and an emotionally distant one as *cold*. And, in fact, research has shown that social exclusion leads people to estimate their surroundings as a couple of degrees colder ([Zhong & Leonardelli 2008](#)) and even causes actual drops in body temperature ([IJzerman et al. 2012](#)). This relationship also seems to work in reverse. Experiences of literal coldness make us feel lonely ([Bargh & Shalev 2012](#)), while experiences of literal warmth can eliminate these negative feelings ([Bargh & Shalev 2012](#); [IJzerman et al. 2012](#)), make us feel closer to other people ([IJzerman & Semin 2009](#)), and even cause us to behave more friendly (i.e. *warmer*) toward them ([IJzerman et al. 2013](#); [Williams & Bargh 2008](#)). This connection between physical and social warmth may have its origin in our own personal developmental histories ([Williams & Bargh 2008](#)) or our species' evolutionary one ([IJzerman et al. 2012](#)). In social species such as ours, close early bonds between infant and caregiver involve much physical contact and thus transfer of body heat, which may help promote shared neural responses to physical and social warmth ([Inagaki & Eisenberger 2013](#))<sup>1</sup>.

The most recent studies in this line of research have gone further, demonstrating the literal truth in even the most complex idiomatic metaphors where the connections between the abstract and concrete concepts involved are “less strong, less intuitive and less stable” ([Hellmann et al. 2013](#)). [Leung et al. \(2012\)](#)

<sup>1</sup> Given all this, we readily admit to some puzzlement over what we have come to refer to as the Canadian paradox. If literal warmth begets social warmth, why are Canadians so friendly?

found that participants who were asked to think creatively while literally sitting inside a box were less creative than those who sat, and thus who thought, *outside the box*. Furthermore, participants who literally *put two and two together* by re-joining coaster halves were subsequently more successful problem-solvers. Dong et al. (2013) found that when people are embarrassed they show a preference for facial cream that helps them to literally restore or *save face*.

What is most encouraging about these most recent embodied effects is that they demonstrate that there actually need not be an obvious connection between the abstract and concrete concepts involved in the metaphor for its literal enactment to work. It seems unlikely, for instance, that there is any strong association, either in our individual developmental histories or in our species' evolutionary one, between experiences of creativity and being outside of boxes<sup>2</sup>.

Thus inspired, we at IGNOBEL scoured the dictionary for useful idioms whose literal embodiment might allow us to influence all kinds of high-level thoughts and behaviors. After pilot testing several hundred idioms<sup>3</sup> we took these ideas and ran with them<sup>4</sup>, developing a number of practical applications which we anticipate will achieve unbelievable results in a number of fields, as follows.

## APPLICATIONS TO CORRECTIONAL PSYCHOLOGY

Obvious opportunities for low-cost interventions in penal institutions arise from work demonstrating that literal experiences of brightness and fresh scents inhibit unethical (i.e. metaphorically *shady* or *dirty*) behavior and promote pro-social behavior (Liljenquist et al. 2010; Zhong et al. 2010). However in our partner institutions we have innovated far beyond simply installing Halogen light-bulbs and daily spritzing of cells with citrus-scented Windex. Working with a small number of progressive penal

institutions, we have creatively applied embodied cognition to design some remarkably simple methods of reducing offender recidivism.

We begin by making inmates literally *face the music* for their wrongdoing (Figure 1, top), which helps them accept the necessity of their incarceration and



**Figure 1.** Embodied idioms for improving offender rehabilitation and reducing recidivism. In order to begin to accept responsibility for their wrongdoing, inmates are forced to stand in front of a speaker playing an auto-tuned litany of their convictions (top), which helps them to *face the music*. Inmates perform daily cleansing rituals, including (middle) rhinotillexis (colloquially known as “nose picking”) which helps them to practice *keeping their noses clean*. During exercise periods, inmates (bottom) *walk the straight and narrow* (this practice also begins by getting inmates to literally *toe the line*, which reinforces the effect).

<sup>2</sup> Indeed, a quick Google image search using the phrase “cardboard box car” or “box fort” reveals that being *inside* a box can be an occasion for much creativity during childhood.

<sup>3</sup> In all our successful pilot tests,  $p = .049$ ,  $ns$  per cell varied from 19-56, covariates may or may not have been used, and results reflected a subset of participants, conditions, and/or DVs. Further details are not available upon request.

<sup>4</sup> Sometimes literally. Several of us at IGNOBEL regularly carried copies of these embodied research reports with us whilst out jogging, which seemed to stimulate us to develop new applications from them. For some reason, we also found we were particularly likely to generate our novel applications of these findings while out to lunch.

begin the process of rehabilitation. Following this, a rigorous routine of personal cleansing begins, helping inmates to *wash away their sins* (see [Zhong & Liljenquist 2006](#)). One particularly beneficial aspect of this regimen is a practice of scrupulous rhinotillexis (Figure 1, middle) to encourage inmates to *keep their noses clean*. It is important that such cleanliness be achieved with lukewarm water at most, since encouraging inmates to *get into hot water* is precisely the metaphorical outcome we are attempting to avoid.

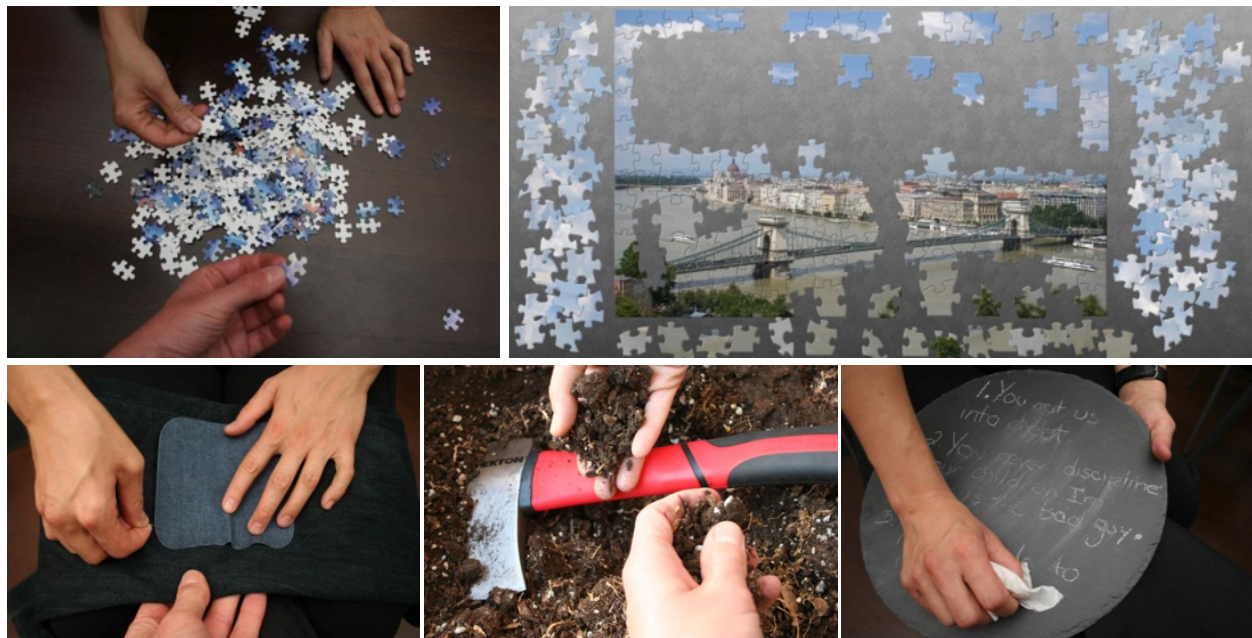
A further innovation, designed to help inmates practice respect for rules and conformity to moral codes of conduct, involves using sticky-tape to create a 1cm-wide line down the middle of the prison exercise yard. Inmates are encouraged to walk the entire length of the line on a daily basis (Figure 1, bottom), which helps inmates learn to *walk the straight and narrow*. Note that it is vital to the success of this practice that no inmate be allowed to *step out of line*, nor to *cross the line* at any point, as these behaviors embody quite the opposite concepts to those we seek to reinforce.

All of these procedures are simple, inexpensive, and effective, requiring no more than extra lights, Windex, soap-and-water, and a piece of tape. By combining them, we anticipate that prisons will achieve unprecedented reductions in recidivism.

## APPLICATIONS TO COUNSELING PSYCHOLOGY

In our work in counseling psychology we have built upon existing findings that demonstrate a role for embodied idioms in marital satisfaction, such as [Huang et al. \(2012\)](#) who showed that couples who commute in the same direction (rather than *going their separate ways*) are more satisfied with each other.

To begin with, we provision our therapeutic settings with air purifiers and peace lilies (*Spathiphyllum*, a plant renowned for its ability to remove airborne toxins<sup>5</sup> – [Wolverton & Wolverton 1993](#)) to aid couples in *clearing the air between them*. We also equip couples with spectacles designed to absorb all wavelengths of light between 600 and 750 nm to ensure that they can no longer *see red* when talking to one another ([Fetterman et al. 2012](#)). During sessions, couples feed each other candy to encourage them to be *sweeter* to each other ([Meier et al. 2011](#)) and to counteract any pre-existing *bitterness*. They then engage in a series of simple activities (see Figure 2) that are the literal embodiment of the work couples must do in counseling to repair their relationships. Once done with these activities, the couples turn their backs on the objects involved, practicing *putting things behind them* (see [Li et al. 2010](#)



**Figure 2.** Embodied idioms for improving outcomes in couples' therapy. Couples completing simple activities which serve as the embodiment of helpful idioms during marital therapy: (top, left) *picking up the pieces*, (top right) *putting things back together* (also, incidentally, *building bridges*), (bottom, left) *patching things up*, (bottom, middle) *burying the hatchet*, and (bottom, right) *wiping the slate clean*.

<sup>5</sup> The plants have thrived since, for just the price of a can of paint, our institute's janitorial staff now all have *green thumbs*.



for a similar embodied method of achieving closure).

Again, the embodiment of these idioms is a relatively trivial matter, yet will (we assume) drastically improve the effectiveness of couples' therapy sessions.

## INDUSTRIAL AND OCCUPATIONAL PSYCHOLOGY

The removal of the traditional office cubicle walls has long been a hallmark of the most creative companies, no doubt because it means all employees are effectively thinking *outside the box* (or the cube). Beyond this obvious application of embodied metaphor, we have found that enacting other idioms also helps in a myriad of occupational contexts. Office chairs in our partner companies are custom-built to remove the seat cushion, leaving only the frame. This ensures that employees must constantly sit *on the edge of their seats*,

generating a sense of excitement about their jobs. Accountants benefit from old-fashioned department lessons in which they are made to literally *balance the books*. Negotiators become markedly more effective once, with the application of some basic food coloring, they become *silver tongued*. After an early setback<sup>6</sup>, we discovered a simple strategy for markedly improving the performance of underachieving employees, no matter what their role in the company: requiring them to *pull their socks up*.

In addition, we have developed a comprehensive package of activities which profoundly improves the generation of creative ideas among executives. To begin, executives form a sports-team-style huddle, literally *putting their heads together*. They then follow the steps outlined in Figure 3, all aimed at aiding the creation and follow-through with new ideas.

We have also found practices embodying meta-



**Figure 3.** Embodied idioms for improving outcomes in I/O psychology. In brain-storming sessions, executives write their initial ideas on index cards, then (top, left) *lay all their cards on the table*, encouraging an open and honest exchange. After pausing to then collect their thoughts, they begin to (top, right) *toss a few ideas around*. Once *struck by an idea*, executives must give it their full commitment, which is facilitated by (bottom, left) *sinking their teeth into it*. (Particularly complex ideas may need to be *chewed on* like this for some time.) When receiving performance evaluations, employees in our partner institutions are encouraged to (bottom, right) *take it on the chin*. (Note that it is not advised that employees then attempt to *laugh it off*, as this employee appears to be doing.)

<sup>6</sup> Contrary to our expectations, it turns out that employees do not perform particularly well when literally *on fire*.

phors to be helpful in the sometimes fraught realm of employee evaluations. When preparing to receive negative feedback, we find it helps to have employees apply face-cream with a collagen-strengthening peptide formulation, in order to develop both a literal, and thus metaphorical, *thick skin*. When receiving feedback, we also ensure that employees *take it on the chin* (see Figure 3, bottom right).

Our partner organizations are now posed to reap the manifold benefits of these revolutionary embodied practices.

## CONCLUSIONS

We understand that, to the reader unfamiliar with research on the embodiment of metaphor and idiom, our suggestions for the practical application of these ideas may seem unusual, perhaps even outlandish. In these times of increasing scrutiny regarding the quotidian research practices (aka QRPs; John et al. 2012) of psychologists, we understand that the present overview of our work may raise a few eyebrows. At the Institute, we ourselves encourage a healthy dose of skepticism in interpreting published reports of research. In fact, embodied language practices can also help us in this regard. We find that, when reading psychology papers, the simultaneous administration of approximately 5mg of sodium chloride markedly improves our critical thinking skills.

Nevertheless, to the skeptics who believe our ideas to be half-baked, we say that the proof of the pudding is in the eating! We suggest that psychological theories in general should live or die by their practical utility in everyday settings. Here we have outlined several ways in which we are embodying idioms in real world contexts for practical benefits and anticipate that the projects outlined here will shortly prove their worth. There are surely other idioms and metaphors with practical applications to be explored as well (see the speculation in Ackerman et al. 2010, and see Li & Liao 2013 and Zarkadi & Schnall 2013 for examples). We encourage our fellow psychologists, whatever their theoretical orientation, to follow in our footsteps. If the proof of the pudding is in the eating, it would be beneficial to our psychological science if we more often attempt to eat the puddings that our theories prescribe.

Ultimately, this is the bottom line.

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