

Research article

# Increased Mimicry of Energy Efficient Models: Observational Learning as an Evolved Tendency

Matthew T. Gailliot

E-mail: [mgailliot@gmail.com](mailto:mgailliot@gmail.com)

(386) 445-1459



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## Abstract

People more readily mimic energy efficient than inefficient models. When ascending a hallway, people were more likely to use the energy-efficient incline than the staircase when research assistants modeled (used) both the incline and staircase than when they did not. Observational learning thus demonstrated a bias toward energy efficiency. Theory suggests that evolution selected on the basis of increased capacities to attain and use efficiently increasingly larger amounts of energy (e.g., sugar, oil, modern technology), suggesting evolved tendencies to attain energy and use it efficiently. Observational learning may be among tendencies to use energy efficiently.

**Keywords:** mimicry, observational learning, modeling, energy, and efficiency

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Life is a metabolic process – its existence rests upon the continual attainment and management of metabolic energy. One underemphasized view is that evolution may have selected on the basis of increased capacities to

attain and use efficiently increasingly larger amounts of energy (e.g., sugar, oil, modern technology, Gilliland, 1978; Lotka, 1922; Odum, 1995). Hence, many psychological processes ought to reflect, or be consistent with, these tendencies.

Observational learning is a very basic process found among many species (Robert, 1990) – lower primates (Tomasello, Davis-Dasilva, Camak, & Bard, 1987), rats (Heyes & Dawson, 1990), cattle (Veissier, 1993), and even invertebrates (Fiorito & Scotto, 1992). Observational learning therefore might reflect increased selection on the basis of attaining metabolic energy or using it more efficiently. The current study tested for evidence consistent with the idea that observational learning evolved on the basis of saving energy.

Evidence suggests that observational learning evolved (Varni, Lovass, Koegel, & Everett, 1979) partly because it improved the capacity to both attain (Hellmann, 1983) metabolic energy and use it more efficiently (Boyd & Richerson, 1995). It can be more efficient to learn by observing others than to learn individually. Indeed, observational learning can be quick and effortless (Vinter & Perruchet, 2002), suggesting its ease or automaticity. Learning is metabolically expensive (Gailliot, 2009; Haier, Siegel, Tang, Abel, & Buchsbaum, 1992; Haymond, 1989; Riby, 2004; White, 1991), and observational learning (e.g., among infants learning to grasp a ball) can help reduce the costs of learning (e.g., the amount of time to learn; Arai, Tominaga, Seikai, & Masuda, 2007; Carver, Shull, & Basili, 2006; Corson, 1967; Hartley, Fagard, Esseily, & Taylor, 2008).

If observational learning evolved on the basis of attaining or conserving energy, then it should be more influential when it improves attaining energy or using it efficiently. The hypothesis tested was that people would more readily mimic energy efficient than inefficient models – observational learning would demonstrate a bias toward energy efficiency.

## Method

People who walked through a hallway participated. The hallway had two walkways – one a staircase and the other an adjacent incline (wheelchair or handicap path). A pilot study in which people ascended both the staircase and incline indicated that the incline was less effortful and required less energy than the staircase, and hence was more efficient.

As a person in the walkway approached the staircase and incline, two female research assistants either ascended both the staircase and incline simultaneously or they did not. Because the incline was more energy efficient, the prediction was that people would more readily mimic (observationally learn from) the female ascending the incline (the efficient model) than the female ascending the staircase (the inefficient model).

## Results

A chi-square analysis indicated that participants were more likely to use the incline than the staircase when the assistants used both the incline and staircase than when they did not,  $\chi^2 = 3.46, p < .05$  (one-tailed; see Figure 1). A model demonstrating efficient behavior – using the incline – thus increased efficient behavior in the form of using the incline rather than the staircase, even though the less efficient behavior – using the staircase – also was modeled.

## Discussion

Evolution may have selected on the basis of increased energy acquisition and efficiency of energy use, thereby suggesting that psychological processes such as observational learning reflect these tendencies. In support of evolved dispositions toward energy-efficiency, people more readily mimicked energy efficient than inefficient models (using an incline rather than a staircase). It is plausible that observational learning represents an evolved tendency to energy efficiency.

Observational learning may be more efficient because one avoids engaging in costly trial and error learning or more easily and quickly learns what to pay attention to (Hellmann, 1983). Learning increases energy use in the brain (Haier, 1992). Observational learning might therefore be efficient because it reduces the amount of energy used in the brain.

Moderators of observational learning might concern energy efficiency or perhaps acquiring energy. Examples include model characteristics such as competence level (Baron, 1970; Gelfand, 1962), prestige (Mausner, 1953), status (Landers & Landers, 1973), age (Bandura & Kupers, 1964), power (Mischel & Grusec, 1966), similarity to the actor (Gould & Weis, 1981), and ingroup-outgroup status (Fliegel, 1977).

One question is whether motivations can be inferred from whether people increasingly follow an efficient (v inefficient) model. If people do not mimic an efficient model (e.g., one who models efficiency in hallway ascension), then they may have another goal or goals that would be less likely to be satisfied by the increased efficient behavior for the other goal. People with exercise goals, for example, may be less likely to mimic a model demonstrating efficiency in hallway ascension because it reduces physical exercise.

Enacting socially appropriate (v inappropriate) behavior can often be more effortful and energy demanding (Gailliot et al., 2007; Gailliot & Baumeister, 2007). To the extent that socially appropriate and inappropriate behavior satisfy the same or similar motivations, then it is possible that models demonstrating inappropriate (v appropriate) behavior might be mimicked more readily because the behaviors they model are less effortful.

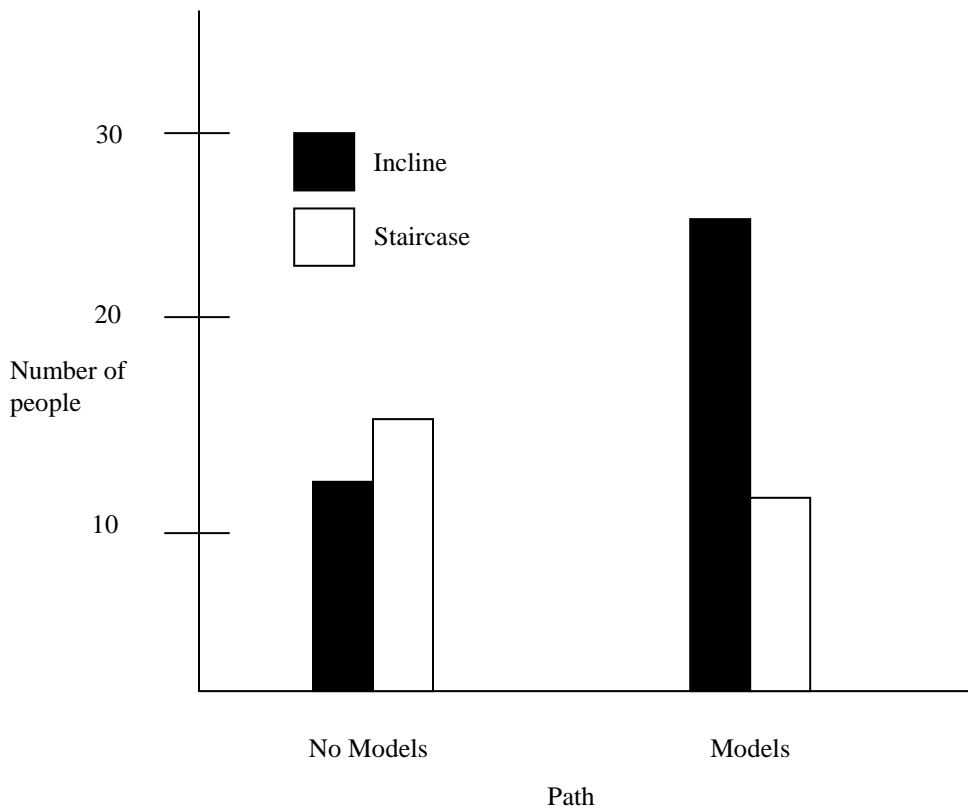
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Figure Caption



**Figure 1:** Number of people who used the incline or staircase as a function of assistants either having or having not ascended both the staircase and stairs soon beforehand.