



LETTERS

edited by Jennifer Sills

Informed Consent in Social Science

IN HIS PERSPECTIVE “*HOMO EXPERIMENTALIS EVOLVES*” (11 JULY, P. 207), J. A. LIST PROUDLY acknowledges that economists perform experiments on human subjects without notifying them: “[I]n a natural field experiment, the analyst manipulates experimental conditions in a natural manner, whereby the experimental subjects are unaware that they are participating in an experiment.

This approach combines the most attractive elements of the laboratory and of naturally occurring data: randomization and realism.” I know that psychologists tend to do the same thing. Yet this practice leads me to ask: Where has “informed consent” gone? **PIERRE COUTURE**

Saint-Cyprien-de-Napierville, QC, Canada.
E-mail: pa_couture@sympatico.ca



Balancing act. Social scientists must walk a fine line in determining when a study’s potential for public good justifies a relaxation of informed consent requirements.

Response

AS MY PERSPECTIVE MADE CLEAR, there are several types of field experiments. In some, subjects are made aware that they are taking part in an experiment and sign consent forms in the spirit of the guidelines of the Nuremberg code. There are, however, certain cases in which adhering to rigid ethical rules can affect the very issue that is being studied, such that it becomes quite difficult to conduct the research (1, 2). For example, if one were interested in exploring whether, and to what extent, race or gender influences the prices that buyers pay for used cars, it would be difficult to measure accurately the degree of discrimination among used car dealers who know that they are taking part in an experiment.

For such purposes, it makes sense to consider executing a natural field experiment. This does not suggest that moral principles should be altogether abandoned in the pursuit of science. Quite the opposite: The researcher must weigh whether the research will inflict harm, gauge the extent to which the research benefits others, and determine whether experimental subjects chose the experimental envi-

ronment of their own volition and are treated justly in the experiment. Local Research Ethics Committees and Institutional Review Boards in the United States serve an important role in monitoring such activities.

Consider the natural field experiment that was discussed in my 11 July Perspective. In this experiment, a coauthor and I worked with a national fundraiser to explore various methods that fundraisers might wish to implement to be able to provide more of the public good. During the research, we never learned the solicitees’ names, solicitees received letters similar to the ones they were sent in the normal course of their lives, and they made charitable donation decisions in a natural manner. In the end, we learned something interesting about the economics of charity while doing no harm to the solicitees. Indeed, some might argue that these potential donors were better off because our methods induced more giving and therefore a higher

provision of the public good. When the research makes participants better off, benefits society, and confers anonymity and just treatment to all subjects, the lack of informed consent seems defensible.

Ethical issues surrounding human experimentation are of utmost importance. Yet, the benefits and costs of informed consent should be carefully considered in each situation. Those cases in which there are minimal benefits of informed consent but large costs are prime candidates for relaxation of informed consent.

JOHN A. LIST

Department of Economics, University of Chicago, and NBER, Chicago, IL 60637, USA. E-mail: jlist@uchicago.edu

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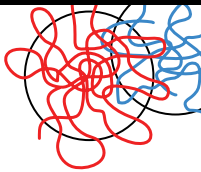
Viewing NASA’s Mars Budget with Resignation

I WOULD LIKE TO CLARIFY SEVERAL POINTS IN the News of the Week story (26 September, p. 1754) by A. Lawler, “Rising costs could delay NASA’s next mission to Mars and future launches.”

When the National Research Council’s Planetary Science Decadal Survey recommended the Mars Science Laboratory (MSL) mission for priority funding, it assigned a cost level of \$650 million. This value, rather than \$1.4 billion, is the true metric for seeing the deep damage that MSL’s profligately overrunning cost—now likely to top \$2.1 billion—has inflicted on NASA’s Mars and wider planetary science budget.

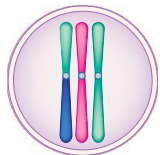
Also, the story focused its overrun discussion on instrument costs. Although certainly part of the problem, instrument cost increases have been considerably smaller than overruns in the rest of MSL’s budget, which was severely mismatched to the project’s complexity from its inception. This mismatch sowed the most fundamental seeds of MSL’s cost problems.

The article’s end quote described NASA’s Mars Sample Return (MSR) mission plan as “smoke and mirrors.” Dis-



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appointingly, MSR is becoming a mirage in the wake of MSL and other budget damage caused by numerous substantial Science Mission Directorate (SMD) cost overruns accepted in recent months. However, as evidenced by both internal NASA and external Office of Management and Budget scrutiny in 2007, NASA's MSR plan in the President's Fiscal Year 2009 budget did fit in SMD's future budget envelope. It could well have launched near 2020, had a strong emphasis on cost control been sustained as a priority.

Finally, there was no mention that a NASA independent review team found numerous development issues that called MSL's 2009 launch date into serious doubt almost a year ago. Nor did it describe that

scenarios for dealing with MSL without causing such deep budgetary damage elsewhere were proposed by SMD but rejected at higher levels in early 2008. That, and the concurrent, forced disbanding of the MSL independent review team, precipitated my resignation as SMD Associate Administrator.

ALAN STERN

Clifton, VA 20124, USA. E-mail: astern2010@aol.com

Food Insecurity's Dirty Secret

ATTEMPTS TO INCREASE CROP YIELDS IN SUB-Saharan Africa have failed repeatedly since the 1960s because soil quality has been

ignored. The Green Revolution of the 1970s bypassed sub-Saharan Africa, and is stalling in the rice-wheat system of South Asia and elsewhere because of soil degradation, organic matter and nutrient depletion, and excessive withdrawal of ground water. Average yields of grain crops in sub-Saharan Africa have stagnated below 1 ton per hectare since the 1960s, with dire consequences on human well-being and ecosystem services. The problem of food insecurity, affecting 854 million people, is worsened by increases in the price of rice, wheat, and other food staples (1-6) and by global warming (7).

Proven soil management technologies, to be promoted in conjunction with improved varieties, include (i) no-till farming with mulch, cover crops, and complex rotations; (ii) water conservation, harvesting, and recycling with efficient irrigation including drip and furrow methods; and (iii) integrated nutrient management with compost, biochar, N fixation, and supplements of nano-enhanced and slow-release fertilizers. The yield potential of improved varieties can only be realized if grown following opti-

mal soils and agronomic management. Rather than giving handouts as emergency aids, resource-poor farmers must be compensated for ecosystem services (e.g., trading C credits) to promote technology adoption and soil restoration.

Food insecurity is exacerbated by emphasis on biofuels (1, 8, 9). We must establish energy plantations (10, 11) (grasses, trees, algae, and cyanobacteria) using soils and waters that do not compete with food production. This energy can be used to provide modern cooking fuels to rural communities in sub-Saharan Africa and South Asia, in a way that will minimize health hazards, promote use of crop residues and dung as soil amendments, and mitigate the Asian soot cloud.

The strong relationship between soil degradation and survival of the past civilizations (12) cannot be ignored. If soils are not restored, crops will fail even if rains do not; hunger will perpetuate even with emphasis on biotechnology and genetically modified crops; civil strife and political instability will plague the developing world even with sermons on human rights and democratic

ideals; and humanity will suffer even with great scientific strides. Political stability and global peace are threatened because of soil degradation, food insecurity, and desperation. The time to act is now.

RATTAN LAL

Carbon Management and Sequestration Center, School of Environment and Natural Resources, The Ohio State University, Columbus, OH 43210, USA. E-mail: lal.1@osu.edu

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CORRECTIONS AND CLARIFICATIONS

ScienceScope: "Free' gets sold" (17 October, p. 359). Biomed Central had revenues, not profits, of €15 million last year.

Special Section on Clinical Trials: "Making clinical data widely available" by J. Kaiser (10 October, p. 217). The article misquoted NIH's Deborah Zarin about a proposal to include narrative summaries of trial data in ClinicalTrials.gov. Zarin did not suggest that NIH's posting of the narratives could be viewed as giving a drug "a stamp of approval." Rather, she said that posting them could be viewed as endorsing a specific interpretation.

Table of Contents: (5 September, p. 1261). The description of the Report "Apobec3 encodes Rfv3, a gene influencing neutralizing antibody control of retrovirus infection" by M. L. Santiago *et al.* was incorrect. The sentence should read, "A resistance factor known to protect mice from retroviral infection is unexpectedly identified as Apobec3, a deoxycytidine deaminase."

Letters: "The case against the *CMJ*'s editors" by N. Čikeš (27 June, p. 1719). Čikeš stated that "the *CMJ*'s impact factor is around 0.8, and it has been declining." In fact, *CMJ*'s impact factor has had an increasing trend and

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reached 1.174 in 2007, thus becoming the first Croatian scientific journal ever to achieve an impact factor greater than 1. Čikeš also failed to state that the decision of the School's Court of Honor against A. Marušić was officially abolished by the Ministry of Science, Education, and Sports (ruling UP/I-040-01/08-01/00001, no. 533-01-08-0001 from 28 January 2008).

Books et al.: "Hard facts about soft animals" by M. Glaubrecht (23 May, p. 1014). In the caption for the photographs on page 1015, *Falcidens halanychi* is erroneously identified as a solenogastre. It is actually a member of Caudofoveata, a different order of small, worm-shaped molluscs.

Reports: "Differential rescue of light- and food-entrainable circadian rhythms" by P. M. Fuller *et al.* (23 May, p. 1074). The following acknowledgment was omitted due to a misunderstanding: We thank C. Weitz and D. Knutti for the *Bmal1* gene construct used in our adeno-associated viral vector and for the description of its construction. In addition, the Supporting Online Material (SOM) contained several errors: In fig. S2, panels B and C were reversed; the legend for panel B described panel C, and the legend for panel C described panel B. In addition, fig. S3B contained an error, a result of mistakenly using an incorrect file to make the plot. The incorrect file was an incomplete working file obtained from the same animal and experiment as shown in Fig. 3B in the main text, but with an incorrect start time (which advanced the phase). Fig. S3D, in which the trace is derived from the data shown in fig. S3B, was

also incorrect. A revised SOM file containing corrected versions of figs. S2 and S3 is available online.

Books et al.: "The golden weed, America's most deadly drug" by R. N. Proctor (4 May 2007, p. 692), book review of *The Cigarette Century* by Allan Brandt. The Books *et al.* editor failed to notice that Allan Brandt's acknowledgments note the substantial assistance of our reviewer, Robert N. Proctor—who provided "a constant sounding board" and "meticulously read and critiqued the complete manuscript."

TECHNICAL COMMENT ABSTRACTS

COMMENT ON "Differential Rescue of Light- and Food-Entrainable Circadian Rhythms"

Ralph E. Mistlberger, Shin Yamazaki, Julie S. Pendergast, Glenn J. Landry, Toru Takumi, Wataru Nakamura

Fuller *et al.* (Reports, 23 May 2008, p. 1074) reported that the dorsomedial hypothalamus contains a *Bmal1*-based oscillator that can drive food-entrained circadian rhythms. We report that mice bearing a null mutation of *Bmal1* exhibit normal food-anticipatory circadian rhythms. Lack of food anticipation in *Bmal1*^{-/-} mice reported by Fuller *et al.* may reflect morbidity due to weight loss, thus raising questions about their conclusions.

Full text at www.sciencemag.org/cgi/content/full/322/5902/675a

RESPONSE TO COMMENT ON "Differential Rescue of Light- and Food-Entrainable Circadian Rhythms"

Patrick M. Fuller, Jun Lu, Clifford B. Saper

The points raised by Mistlberger *et al.* arise from a shortcoming in their approach, namely, that they measure the response to food restriction by using food-seeking behavior, which is confounded by homeostatic inputs. We used unrelated circadian-driven physiological responses, and we stand by our finding that the dorsomedial nucleus of the hypothalamus contains a food-entrainable oscillator that is sufficient for entrainment of circadian rhythms of body temperature and locomotor activity.

Full text at www.sciencemag.org/cgi/content/full/322/5902/675b

Letters to the Editor

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