

psychosocial stress and immunodeficiency virus disease in rhesus macaques



John P. Capitanio

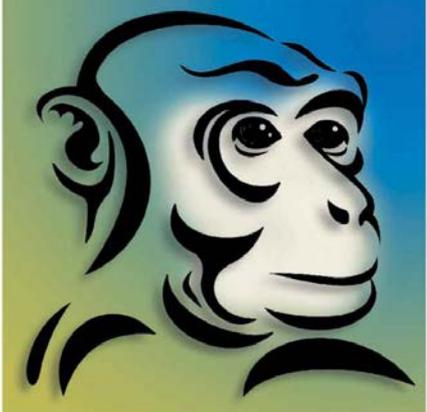
Dept. of Psychology

California National Primate Research Center

University of California, Davis

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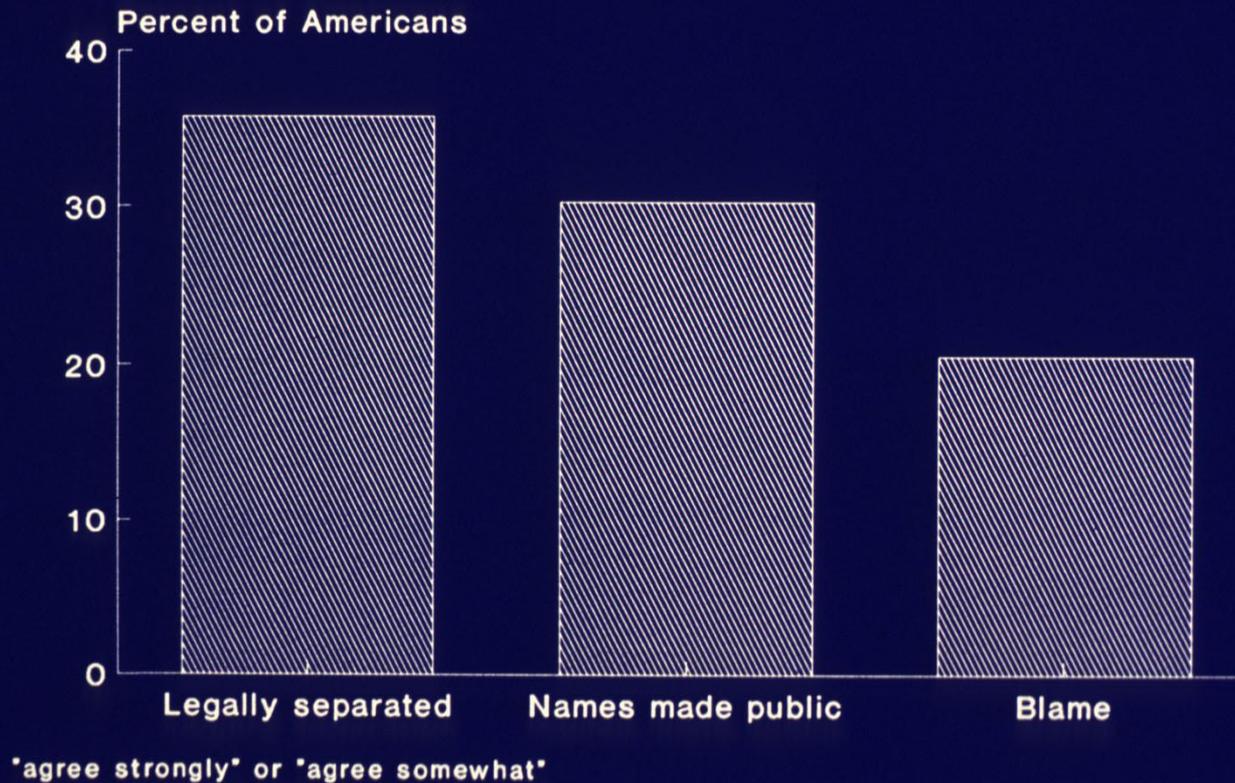
Outline

- ① What was the problem?
- ② What is the model?
- ③ How did the model develop?
- ④ How/why was the model successful?

What was the problem?

- ◎ 1984 – “Psychosocial factors might be associated with disease progression and survival, both indirectly and directly. Indirect effects include those factors associated with delay in seeking medical attention, compliance, and self-management. In addition, ***emotional and personality factors might have direct influences on the onset and course of the disease.***”
 - Coates, Temoshok, Mandel, 1984, p. 1310

Responses to stigma items Attitudes



-- Herek & Capitanio, 1993

Sacramento Men's Health Study

Herek & Glunt, 1995

- Mean number of losses
 - Close friends/lovers 2.04
 - Casual friends/acquaintances 2.67
- Percentage of respondents with 5+ close friends/lovers died 27.1%
- Mean number of friends living with HIV
 - Close friends/lovers 2.70
 - Casual friends/acquaintances 2.97
- Percentage of respondents with 5+ close friends/lovers HIV+ 32.3%

What is the model?

- ◉ An existing animal model of HIV Disease: simian immunodeficiency virus (SIV) infection of rhesus monkeys.
- ◉ A model of psychosocial influences on SIV disease:
 - Well socialized adult males from our breeding colony are housed individually, but meet for 100 min per day of socialization;
 - Stable groups – group size is 3 animals, identity remains constant;
 - Unstable groups – group size varies from 2-4 animals per day, identity of partners changes daily;



What is the model?

- ⦿ Compared to animals in stable social groups, animals in unstable social groups:
 - Show more conflict and less affiliation;
 - Show shorter survival;
 - Show altered regulation of the hypothalamic pituitary adrenal axis;
 - Show increased expression of genes for inflammatory cytokines;
 - Show higher densities of catecholaminergic varicosities in lymph nodes;
 - And some of these effects are especially strong in those animals in unstable social groups that are low in the personality trait, Sociability.
- ⦿ Working on currently:
 - Whether beta-blockers can impact disease progression;
 - Whether artificial stimulation of the sympathetic nervous system (via methamphetamine) amplifies these effects.

How did the model develop?

- Start with a model of the disease itself;
- Develop experimental manipulations through an understanding of the life-history of the model species, in both the wild and in captivity – this model was generated by primatologists;
- Began with archival studies (1991, 1998);
- Involved collaboration from the beginning, but additional collaborators, with different interests and expertise, became involved;
- Required an infrastructure to support the studies -- NPRCs;
 - Colony of animals to choose from;
 - Collaborative expertise;
 - Core services in immunology and virology, that had species-specific reagents.

How/why was the model successful?

- The broader model (rhesus/SIV) recapitulated the pattern of the disease in an accelerated fashion, compared to humans;
- The model species shows important similarities with humans:
 - Phylogenetic proximity (common ancestor ~23 mya).
 - Social similarity (are continuously social, 24/7/365, which is relatively rare in mammals).
 - Psychological similarity (sophisticated cognition)
- Model provided for tight experimental control that was impossible to achieve in human studies;
- Our studies modeled important aspects of “stress” experienced by humans – unpredictability in one’s social opportunities;
- Model was in the right place at the right time – a variety of studies being done in humans examining psychosocial stress (bereavements, felt stigma, etc.) in AIDS, and in other human diseases;
- A set of ready resources (expertise, infrastructure) was available to support the studies;
- We were able to leverage the model to explore mechanisms beyond the original team’s expertise via collaborations.

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