

Abstract

A Content Analysis of Verbatim Explanations (CAVE) study of all chemistry Nobel laureates' English language banquet speeches ($N = 79$) given in Stockholm (1921 – 2006) showed that the chemists are very optimistic, with strong positive emotions that arguably help them be especially creative and satisfied in their work. The results first compared to a sample from the laureates in physiology or medicine ($N=41$), then in combination, support the contention that eminent scientists, though optimistic, also use healthy skepticism, defensive pessimism, and prudence in their approach to research. Finally, the Nobel laureates' explanatory styles appear to be consistent with a sense of equanimity and low ego attachment with outcomes, particularly evident in the moderate internality and controllability ratings as well as in the low positive attributional bias.

Background and Study Goal

Opportunity: Basic U.S. chemistry R&D is in decline in publications and students seeking PhDs (National Research Council, 2007). Yet, the U.S. has an instinct to respond to challenges and to seek innovation.

Fredrickson & Losada found that about a 2.9 ratio of positive to negative emotion *broadens and builds* a team's options in creative problem solving and developing of opportunity (2005).

Measures of explanatory styles such as CAVE and ASQ are validated means to gauge levels of optimism → positive emotion.

Therefore the Goal: Find out if CAVE applied to Nobel laureates' banquet speeches reveals healthy explanatory styles and positive emotions that would in turn foster innovation and high levels of achievement.

Hypotheses

•Precocious, highly ambitious, competitive people are in the minority among Nobel laureates. Most instead are Type B personalities who have patience, perspective and prudence.

•Nobel Prize winners are basically optimistic people with a healthy sense of perspective about their work and low need to control.

Consequently, the hypotheses expect explanatory styles to reveal neither high nor low values for internality and controllability for both positive and negative events.

Methods: CAVE

Content Analysis of Verbatim Explanations

- 1) Coders who are blind to the hypotheses extract the speakers' attributional statements – those of proximate cause and event.
- 2) Separate coders rate the statements on their negativity, internality, controllability, globality and stability.
- 3) Ratings get compiled, correlated and averaged.

Results: Example Statements w/ Ratings

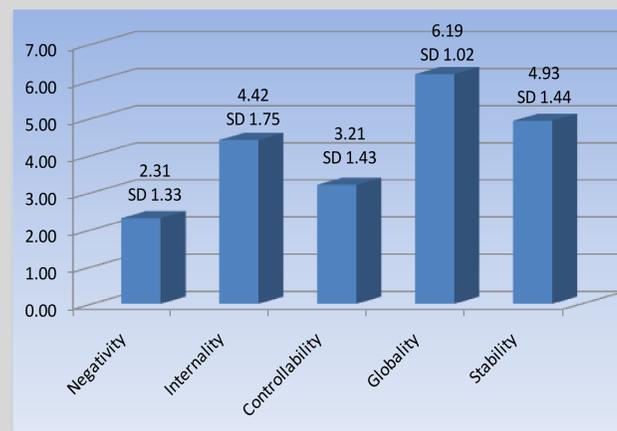
For centuries the **maxim** ["Know thyself"] has been **preserved** in human memory **by** these very **molecular processes** in the brain that you graciously recognize today, and that we are just beginning to understand.

Negativity=3 Internality=6
Controllability=2 Globality=7
Stability=6

We all know that **chance**, fortune, fate or destiny - call it what you will - has **played** a considerable **part in** many of the great **discoveries** in science.

Negativity=3 Internality=5
Controllability=2 Globality=7
Stability=6

Results: Overall Average Ratings



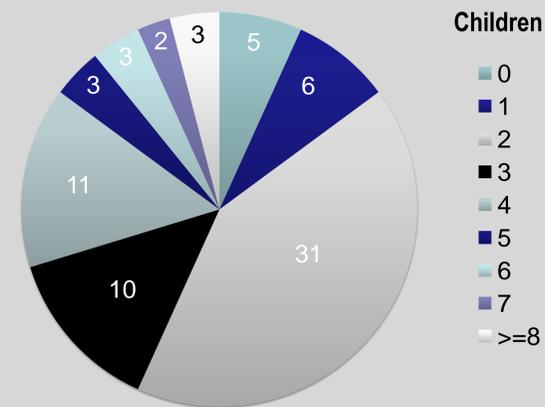
Chemistry + Physiology & Medicine Attributional statements $N=120$, average ratings. (Analysis of variance (ANOVAs) revealed no significant difference between the Chem. and Phys. & Med. average results.)

Results: Correlations Among Dimensions

	Int	Con	Glo	Sta
Int	1			
Con	0.45	1		
Glo	0.11	0.16	1	
Sta	0.31	0.33	0.40	1
Mean	4.40	3.21	6.20	4.82
Std Dev	1.77	1.41	1.00	1.45

Chemistry combined with Physiology & Medicine:
Intercorrelations: For positive events only ($N=103$)

Demographic Data



Chemistry laureates 1901-72 ($N=82$), number w/ children

90.2% of chemistry laureates between 1901 and 1972 were married; 84.2% had children. Fewer than five laureates were divorced. The average age at time of death was 76.1 years.

Discussion

•The overall, average explanatory style of the chemistry laureates was not significantly different from that of the physiology and medicine laureates.

•The high globality rating shows that the Nobel laureates view the positive events as having significant impact in many aspects of their work, perhaps even their lives.

•The moderate internality and controllability ratings indicate a decidedly limited sense of control over positive events. The laureates view chance and external causes as still important.

•The laureates show somewhat less *self-serving attributional bias* for positive vs. negative events than the authors of corporate annual reports, indicating humility - accurate self-knowledge.

•The chemistry laureates (1901-1972) show evidence of many having flourishing, **energetic** lives - prolific achievements in their research work and healthy, long-lasting marriages that produced children.

Conclusions

•The explanatory styles of the Nobel laureates indicate:

- ✓Prudence & perspective,
- ✓Low ego attachment to the outcomes of their research,
- ✓Mindfulness & equanimity,
- ✓Continued high achievement, healthy lives and longevity.

•Study limitations and considerations:

- ✓Social desirability, such as incentive to express gratitude and external attribution for positive events.
- ✓Possible influence of rater bias.

Significance and Implications

An optimistic approach to science research usually works better than a pessimistic one.

- Positive emotions yield creative ideas, but ...
- Negative emotions yield discernment about ideas.

Context sensitive, defensive pessimism is still important!

- An optimistic scientist is more likely to be resilient in the face of inevitable setbacks in research and apt to treat them as learning experiences, while ...
- A pessimistic scientist is prone to be risk-averse and passive, where research demands a prudent approach to creative risk taking.

Plans for Further Study and Analysis

- Apply CAVE method to all Nobel speeches in physiology & medicine, physics and economics.
- Examine the laureates' biographical information:
 - ✓CAVE applied to autobiographies
 - ✓Indications of well-being, health & longevity in biographies
- Collect a sample of ASQ data from current Nobel laureates.

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References

- Anonymous (2007). The official web site of the Nobel Foundation. Copyright © 2007 The Nobel Web AB. nobelprize.org
- Fredrickson, B. L., & Losada, M. F. (2005). Positive affect and the complex dynamics of human flourishing. *American Psychologist*, 60, 678-686.
- Lee, F., Peterson, C., & Tiedens, L. Z. (2004). Mea culpa: Predicting stock prices from organizational attributions. *Personality and Social Psychology Bulletin*, 30, 1636-1649.
- National Academy of Sciences (2007). The Future of U.S. Chemistry Research: Benchmarks and Challenges. National Research Council Report, Executive Summary.
- Peterson, C., Semmel, A., Von Baeyer, C., Abramson, L. Y., Metalsky, G. I., & Seligman, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research*, 6, 287-300.
- Zullow, H. M., Oettingen, G., Peterson, C., & Seligman, M. E. (1988). Pessimistic explanatory style in the historical record: CAVING LBJ, Presidential candidates, and East versus West Berlin. *American Psychologist*, 43, 673-682.

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