

# Two dimensions in states of physical disturbance

## Change of State Verbs – Empirical and Theoretical Perspectives

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# Introduction

## A cracked windshield



<https://commons.wikimedia.org/w/index.php?title=User:WILLAV-FR&action=edit&redlink=1> WL-BF-Pare brise et passage de bas fond.jpg

## And another



[https://commons.wikimedia.org/w/index.php?title=User:B.H.\\_Dhiaeddine&action=edit&redlink=1](https://commons.wikimedia.org/w/index.php?title=User:B.H._Dhiaeddine&action=edit&redlink=1)

# Introduction

- ▶ Multi-dimensionality in degree interpretations of deverbal adjectives of “physical disturbance”
- ▶ The relationship between the scale structures of verbs and their deverbal adjectives
- ▶ *crack, dent, scratch*

- (1) a. The tank is cracked. (COCA:  
<http://savethepinkbathrooms.com/2009/03/25/take-the-pledge-and-share-your-story/>)
- b. The sink is scratched and dented.  
(COCA: John Clemans, 2004 “Galley Makeover: You can add both value and livability to your boat by renovating its galley. Here’s how one owner did it” *Motor Boating*)

# Introduction

- ▶ Physical disturbance deverbial adjectives are associated with two scalar dimensions:
  - i. one related to the affected object
  - ii. one related to the disturbance itself
- ▶ both are associated with closed scales, but (i) is also compatible with a lower-closed interpretation

# Overview

- ▶ Background
- ▶ A preliminary look at the scalar properties of deverbal adjectives of CoS verbs
- ▶ States of physical disturbance
- ▶ Physical disturbance deverbal adjectives are gradable and closed-scale
- ▶ The two dimensions of physical disturbance deverbal adjectives and their distinct scalar properties
- ▶ Discussion and concluding remarks

# Background

- Change of state verbs: causative/inchoative alternation, unaccusativity, event structure  
e.g. Fillmore (1970), Dowty (1979), Levin and Rappaport Hovav (1995)
- More recently, informed by the study of scale structure, greater attention to deadjectival CoS verbs  
e.g. Hay et al. (1999), Kennedy and Levin (2008), Beavers (2008), Rappaport Hovav (2014)

# Background

## A scalar typology of change of state verbs

Scale type	Two-valued	Multipoint Upper bound	Multipoint Lower bound	Open
Adjectival property base	<i>dead</i>	<i>flat</i>	<i>wet</i>	<i>long</i>
Deadjectival verb	<i>die</i>	<i>flatten</i>	<i>wet</i>	<i>lengthen</i>
Deverbal property base	<i>cracked</i>	<i>thawed</i>	all deverbal scalar properties are lower bounded	<i>stretched</i>
Verb	<i>crack</i>	<i>thaw</i>		<i>stretch</i>

Rappaport Hovav (2014: 266, Table 12.1)

# Question

To what extent is there a shared property base between a CoS verb and its related deverbal adjective?



# Background

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Rappaport Hovav (2014: 266, Table 12.1)

# A preliminary look

## Dying vs. cracking

- ▶ scale structure correlated with gradability of adjectives (Wechsler 2001, Beavers 2008)
- ▶ two-point scales: punctual verbs, non-gradable adjectives, e.g. *die*; *dead*, *#more dead*

(2) a. The mirror will crack in five minutes. (after, no duration reading)

b.??The ice cracked for two days.

c. However, rock near the heater borehole sampled in the north heater drift was found to be **more cracked** than rock near the borehole sampled in the south heater drift (<https://www.osti.gov/servlets/purl/59353>, accessed Feb 21 2022)

# A preliminary look

## Cracking vs. shattering

- ▶ Yet not all deverbal adjectives of basic CoS verbs describing physical damage are gradable:

(3) a. The vase will shatter in two minutes. (after, no duration reading)

b. #This vase is more shattered than that one.

# Physical disturbances

- Physical disturbance: an irregularity in an object that is part of the object, and may be imagined to move around the object, also known as the “host” of the disturbance (Karmo 1977).
- Physical disturbance deverbal adjectives are a subset of adjectives derived from change of state (CoS) verbs. They are compatible with, but need not entail, prior events of change (Gawron 2009, Koontz-Garboden 2011).
- They do entail that an object is physically irregular in some way, and the nature of that irregularity is that of a physical disturbance.

## Physical disturbance deverbal adjectives are gradable

- (4) a. However, rock near the heater borehole sampled in the north heater drift was found to be **more cracked** than rock near the borehole sampled in the south heater drift  
(<https://www.osti.gov/servlets/purl/59353>, accessed Feb 20 2022)
- b. The replacement is **more dented** than the first!  
(<https://www.homebrewersassociation.org/forum/index.php?topic=36066.0>, accessed Feb 20 2022)
- c. Rough grit sandpaper will make the dashboard **more scratched** than it already is, . . .  
(<https://www.cashcarsbuyer.com/how-to-remove-scratches-from-plastic-car-interior/>, accessed Feb 20 2022)
- d. The top of the table is **more scratched** than when I first saw it, the gouge deeper.  
(COCA: Joyce Wadler, “Can Taste Be Taught?” the New York Times 2007)

# Physical disturbance deverbal adjectives are closed scale items

- Nonetheless, Rappaport Hovav's classification is consistent with degree modification behaviour of physical disturbance deverbal adjectives:
- These adjectives seem to combine most naturally with *badly* to indicate the degree of the disturbance, suggesting that they are associated with closed scales (Kennedy and McNally 1999, McNally and Kennedy 2002, 2005).

# Physical disturbance deverbal adjectives are closed scale items

- (5) a. He was an old, half-blind, dust-colored mutt with a **badly scratched** nose. (COCA: Brian Morton 1998 “Starting out in the Evening”, New York: Crown Publishers)
- b. TOSS **badly dented** cans, damaged boxes, expired packages, and anything that looks as if it’s spoiled. (COCA: Good(enough) housekeeping, Nov 2009 Vol. 249, Iss. 5; pg. 39)
- c. The ancient Mazda hatchback with three hubcaps and a **badly cracked** windshield hung in the gutter with its front wheels sideways. (COCA: John Grisham 1991 *The Firm* New York: Doubleday, 1st ed.)

# Physical disturbance deverbals are closed scale items

– This use of *badly* is synonymous with the use of *well* – also indicating high degree:

- (6) a. Road maps in a **well cracked** ceiling the signs aren't hard to find  
(James Taylor 1968 *Something's Wrong* lyrics  
[https://www.lyricsfreak.com/j/james+taylor/somethings+wrong\\_20069168.html](https://www.lyricsfreak.com/j/james+taylor/somethings+wrong_20069168.html), accessed Feb 22 2022)
- b. Had a **well dented** left fender, but Jeff pulled it out in about 3 hours.  
(<https://usa-stores.worldorgs.com/catalog/huntington-beach/auto-body-shop/beach-cities-painless-dent-removal>, accessed Feb 23 2022)
- c. Bought this to put on the side of a **well scratched** couch but it was ignored.  
<https://www.amazon.com/LsaiFater-Scratching-Natural-Protect-14-9x23-6/dp/B07T81ZYZH?th=1> (Amazon product review for a cat scratching board, accessed Feb 22 2022)



# Physical disturbance vs. other kinds of damage

– The irregularity described by a physical disturbance predicate has a minimum instantiation that is physically bounded, correlating with the root showing a count noun form.

(7) X is dented/cracked/scratched/creased  $\models$  There is a dent/crack/scratch/crease in X.

(8) a. X is damaged  $\not\models$  \*There is a damage in X; but allows  
b. There is damage to X.

(9) a. X is shattered  $\not\models$  \*There is a shatter in X  
b. \*There is shatter to X.

# Two dimensions of states of physical disturbance

- The two dimensions of physical disturbance states are manifested in the degree interpretations of the relevant deverbal adjectives, e.g.
- *badly cracked*:
- one long, deep crack
- many cracks, which may or may not be long/deep

# Two dimensions of states of physical disturbance

- (10) a. Road maps in a **well cracked** ceiling the signs aren't hard to find  
(James Taylor 1968 *Something's Wrong* lyrics  
[https://www.lyricsfreak.com/j/james+taylor/somethings+wrong\\_20069168.html](https://www.lyricsfreak.com/j/james+taylor/somethings+wrong_20069168.html), accessed Feb 22 2022))  
(branched out cracks)
- b. I once had a mass market copy of *The Stand* that had a **well-cracked** spine sitting on the back seat of my car.  
(<https://tobiasbuckell.com/spine-cracker/>, accessed Feb 22 2022)  
(deep crack)

# Two dimensions of states of physical disturbance

- (11) a. Had a **well dented** left fender, but Jeff pulled **it** out in about 3 hours.  
(<https://usa-stores.worldorgs.com/catalog/huntington-beach/auto-body-shop/beach-cities-painless-dent-removal>, accessed Feb 22 2022,  
(deep dent))
- b. We always ask for a **well dented** car. Most are only a year or two old, but if you get it pre-dented, it's hard to tell if you've added to the mess!  
([https://www.tripadvisor.com.au/ShowTopic-g147346-i222-k679569-Car\\_Rentals\\_in\\_SXM-St\\_Martin\\_St\\_Maarten.html](https://www.tripadvisor.com.au/ShowTopic-g147346-i222-k679569-Car_Rentals_in_SXM-St_Martin_St_Maarten.html)) (many dents)

## Two dimensions of states of physical disturbance

- Each dimension can be independently specified (Sassoon 2013).
- Notably, only in degree modification or comparative contexts

- (12)
- a. Your front bumper is more dented with respect to dent size, but your rear bumper is more dented with respect to the sheer number of dents.
  - b. Your front bumper is badly dented in every respect you can name!
  - c. #Your front bumper is dented with respect to dent size/number of dents/in every respect.

# Two dimensions of states of physical disturbance

– Adopting Solt's (2018) analysis for multi-dimensionality in adjectives:

$$(13) \quad \llbracket \text{dented} \rrbracket^c = \lambda d \lambda x. \mu_{DENTED}^c(x) \succeq d$$

a.  $\mu_{DENTED}^c(x) =$

b.  $\mu_{EXTENT}^c(\text{disturbance}_{DENT}(x))$

c.  $\frac{\mu_{QUANTITY}^c(\text{disturbance}_{DENT}(x))}{\mu_{SURFACE\ AREA}^c(x)}$

# The two dimensions show different scalar properties

- An unexpected phenomenon: Physical disturbance adjectives may also combine with *much*, not clearly known to be compatible with closed scale adjectives. As suggested in Kennedy and McNally 2005, *much* generally seems to occur with lower closed scale adjectives.
- The use of *much* seems only to evoke the “host” dimension

- (14) a. There is a **much cracked** dish of the “Doghouse Club” which was founded in 1962 by a group of driver’s wives and girlfriends – including Betty Brabham – to provide some much needed paddock social activities and facilities.

(<https://loosefillings.com/2017/07/15/its-amazing-whats-still-out-there-2/>, accessed Feb 21 2022)

- b. Final removal of the matrix from the Paranthropus temporal bone exposed a very finely broken up surface resembling a **much cracked** egg.

(<http://bionames.org/bionames-archive/issn/0255-0172/2/484.pdf>, accessed Feb 21 2022)



- (15) a. Going to a large object covered by a dusty old tarp, Mason rolled back the tarp, revealing the still shiny chrome of a **much dented** front bumper . . .  
(Curtiss Ann Matlock, 2013 *Driving Lessons* Harlequin, accessed Feb 21 2022)
- b. In too many golf shops, the arrangements for keeping machinery oiled are haphazard. One finds a **much dented** oil drum in a dirty corner and a few dirty oilers on a window sill from which oil is dripping to the floor.  
(William M. Noble: *A plea for better care of equipment* United States Golf Association vol.IV no.9  
<http://gsr.lib.msu.edu/1920s/1924/2409217.pdf>, accessed Feb 21 2021)

- (16) a. My only primary source was my mother's birth certificate and a **much scratched** photo of Fred.  
(<https://www.bbc.co.uk/remembrance/wall/record/8822>, accessed Feb 21 2022)
- b. Eventually an almost complete version turned up on a **much scratched** 16mm print.  
(<https://werk.re/2015/01/25/metropolis-blu-ray-review/>, accessed Feb 21 2022)

- The availability of *much* is surprising if *cracked* is associated with a totally closed scale in both dimensions.
- It does not help to broaden the purview of *much* to include totally closed scale adjectives, since it would not help to explain the incompatibility of *much* with the disturbance dimension.
- Nor does it help to claim that the scale associated with the host dimension is lower closed and not upper closed, since the host dimension can be accessed via modifiers such as *completely* that target the maximal degree of a scale, which suggests it is also upper closed.

- (17) a. I have an LG G2 with a **completely cracked** screen, and the screen is black underneath.  
(<https://joyofandroid.com/unlock-android-device-with-cracked-or-broken-screen/>, accessed Feb 23 2022)
- b. The woman then zooms out to show the extent of the damage — a **completely dented** and severely scratched passenger side.  
(<https://gorgenewscenter.com/2021/08/16/sorry-i-hit-your-car-heres-some-chocolate/>, accessed Feb 23 2022)
- c. Continue this across the whole surface, until you are left with a **completely scratched** coat (note from SW: of plaster).  
(<https://www.wonkeedonkeetools.co.uk/plasterers-scratchers/how-do-you-use-a-plasterers-brush>, accessed Feb 23 2022)

- A possible understanding: The host dimension is compatible with both totally closed and non-upper closed interpretations.
- In contrast, the disturbance dimension is associated with a totally closed scale. This would be the sense compatible with Rappaport Hovav's (2014) classification.
- However this point is reconciled, it further illustrates the independence of the host and disturbance dimensions.

## To summarize

- Deverbal adjectives of physical disturbance are associated with two dimensions, one related to the disturbance itself, and one to the host.
- These dimensions can be independently identified, and they contrast in their scalar properties.

# Discussion

- The scalar properties of an adjectival property base seem to be retained in related deadjectival verbs.
- This parallel seems to break down somewhat in the other direction: a shared property base between a basic CoS verb and its related deverbal adjective does not always yield the same scalar properties.
- In the case of physical disturbance deverbal adjectives, the verb's scalar properties seem to correspond with that of the disturbance dimension, and not the host dimension.
- Since the host corresponds to the affected object, and the disturbance to the physical irregularity, one avenue to explore would be that the CoS is one of coming to have the irregularity:  
 $\lambda e \lambda x \dots [\text{BECOME}[x, \text{HAVE.A.CRACK}]](e)$

# Concluding remarks

- Looking forward, basic CoS verbs with two-point scales and their related deverbal adjectives point to another area for investigation in change of state predication.
- Also relevant: properties of the related count noun and the host object.
- Some possibilities: *break, bend, crinkle, cut, crease, dimple, fold, fracture, rumple, tear, wrinkle, ...*



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