## Localizing the effects on the English particle verb alternation

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- Themed session:

Language variation and linguistic theory

## Syntactic Variation

- how does it operate in grammar and in usage?
- Adger \& Smith 2010
- Nevins \& Parrott 2010
- Kroch 1994
- Bresnan et al. 2007
- morphosyntax: e.g. variation in is/are, was/were
- Big Two syntactic alternations: dative, particle verb


## The Particle Verb Alternation

- Rebecca cut open the pineapple. (VPO order)
- Rebecca cut the pineapple open. (VOP order)
- historically VOP rare, stable $-20^{\text {th }} \mathrm{c}$. increase
- spoken registers favor VOP more than written
- UK now favors VOP more than US does
- meanings range from transparent to idiomatic
- very extensively studied for over 100 years


## The Main Linguistic Constraints (O)

- object weight (heavy favors VPO)
- I cut open the big juicy pineapple from Tesco.
- ? I cut the big juicy pineapple from Tesco open.
- two reasons: ordinary end-weight, V-P dependency
- object information structure (new favors VPO)
- What did you pick up at the supermarket?
- I picked up some fish. - ? I picked some fish up.
- object topic/focus (focus favors VPO)
- overlaps w/ info. structure, but can be independent


## The Main Linguistic Constraints (V, P)

- exclude full V, P, O idioms: either fixed order
- bring home the bacon - keep your shirt on
- V, P continuum from idiomatic to transparent
- when V and P meanings independent, VOP easier
- give up, carry out vs. turn around, carry out (literal)
- effects of V and P (independent of the other)
- context beyond discourse: put the kettle on
- persistence effects: previous particle verbs


## Our Syntactic Proposal

- the alternation can arise in two (three) ways
- Head raising of the particle
[PredP $\underbrace{\text { P-p-Pred }\left[p p ~ O B J E C T ~\left[p^{\prime}\right.\right.} \underbrace{\text { P-p [pP P }]]]]}$

Old information object contexts
cut [TopicP [DP the tree] [TOPIC] [Topic ${ }^{\prime}$ Topic [Predp [DP the tree] down]]]
Narrow object focus contexts
cut [TopicP down $\underbrace{\text { [Topic }}_{\text {[TOPIC] }]}{ }^{\prime}$ Topic [PredP the tree down]]]

## Data Sources \& Methods

- previous studies: corpora, lexical decision task, forced choice, relative rating of alternatives
- this study: acceptability judgment experiments, corpus studies (Twitter, Brown Family)
- analysis: mainly mixed-effects regression
- new: exp. subjects rated orders separately
- new: effect correlations across subjects reveals...
turn the light on
turn the light(s) on
turn the lights on
turn the light off turn the light(s) off turn the lights off
turn the light on turn the light(s) on turn the lights on


# Twitter Corpus ( $\mathrm{N}=2001$ ) 

$\mathrm{V}, \mathrm{P}$, and O are basically held constant
US/UK, off/on, lights/light (UK), turned/turn/turns are some just proxies for discourse/contextual effects?


Brown Corpus Family ( $\mathrm{N}=2557$ ) object $=\mathrm{D}+\mathrm{N}, \mathrm{VP}$ transparency not controlled


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```
(a)round
along
through
over
down
in
on
off
about
out
up
cive make pick carry switch pull set hold take throw bring turn put keep
```

Brown Corpus Family ( $\mathrm{N}=2557$ ) object $=\mathrm{D}+\mathrm{N}, \mathrm{VP}$ transparency not controlled
(a)round
along
through
over
down
in
on
off
about
out
up

| put on |  |
| :---: | :---: |
| carry out | model 1: 0.169 |

give make pick carry switch pull set hold take throw bring turn put keep

## Brown Corpus Family ( $\mathrm{N}=2557$ )

 object $=\mathrm{D}+\mathrm{N}, \mathrm{VP}$ transparency not controlled(a)round

```
along
```

through
over
down
in
on
off
about
out
up

## take out

pull up
model 1: 0.062
model 2: 0.129
observed: 0.20

Brown Corpus Family ( $\mathrm{N}=2557$ ) object $=\mathrm{D}+\mathrm{N}, \mathrm{VP}$ transparency not controlled

Experiment 1 (297 subjects from US, Canada, UK/Ireland) all VPs have transparent semantics object weight (and information structure) controlled for
down
fificdiderywin
VPO +0.1
0
$+0.1$
$+0.2$
$+0.3$
sentiawd up pushed in
denemtip
setaciotrid
nallucizorff

Experiment 2 ( 125 subjects from US) all VPs have transparent semantics object $=\mathrm{D}+\mathrm{N}$, focus controlled for

## United States

VPO order VOP order

## UK / Ireland

VPO order VOP order

## Experiment 1 - country effect

## United States

VPO order VOP order

UK / Ireland
VPO order VOP order
0.53


## Experiment 1 - country effect

| 1 | United States | UK / Ireland |  |
| :---: | :---: | :---: | :---: |
| 0.9 | VPO order | VOP order | VPO order |

## Experiment 1 - country effect

## Experiment 1 - country effect



## Experiment 1 - country effect

## Experiment 1 - weight effects

| 1 |
| :---: |
| 0.9 |
| 0.8 |
| 0.7 |
| 0.6 |
| 0.6 |
| 0.5 |
| 0.4 |
| 0.3 |
| 0.2 |
| 0.1 |
| 0 |

VOP order
light object heavy object
VPO order


## Experiment 1 - weight effects <br> production vs. <br> prediction

| +0.20 |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| +0.15 |  |  |  |  |  |  |  |  |
| +0.10 |  |  |  |  |  |  |  |  |
| +0.05 |  |  |  |  |  |  |  |  |
| heavy - light obj. |  |  |  |  |  |  |  |  |
| VPO order |  |  |  |  |  |  |  |  |
| -0.05 |  |  |  |  |  |  |  |  |
| -0.10 |  |  |  |  |  |  |  |  |
| -0.15 |  |  |  |  |  |  |  |  |
| -0.25 | -0.20 | -0.15 | -0.10 | -0.05 |  | light obj P er | +0.05 | +0.10 |

## Experiment 1 - weight effects



$$
\text { Experiment } 1 \text { - weight effects } \quad \begin{gathered}
\mathrm{r}=-0.392 \\
\mathrm{~b}=-0.522 \\
\mathrm{p} \approx 0
\end{gathered}
$$



## Experiment 2 - focus effects

| 1 | object topic | VP focus |  | wide focus |  | object focus |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0.9 | VPO VOP | VPO | VOP | VPO | VOP | VPO | VOP |
| 0.8 | 0.16 |  |  |  |  |  |  |
| 0.7 |  |  |  |  |  |  |  |
| 0.6 |  |  |  |  |  |  |  |
| 0.5 |  |  |  |  |  |  |  |
| 0.4 |  |  |  |  |  |  |  |
| 0.3 |  |  |  |  |  |  |  |
| 0.2 |  |  |  |  |  |  |  |
| 0.1 |  |  |  |  |  |  |  |
| 0 |  |  |  |  |  |  |  |

## Experiment 2 - focus effects



## Experiment 2 - focus effects

| 1 | object topic |  | VP focus |  | wide focus |  | object focus |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0.9 | VPO | VOP | VPO | VOP | VPO | VOP | VPO | VOP |
| 0.8 | 0.16 |  | 0.09 |  | 0.05 |  |  |  |
| 0.7 |  |  |  |  |  |  |  |  |
| 0.6 |  |  |  |  |  |  |  |  |
| 0.5 |  |  |  |  |  |  |  |  |
| 0.4 |  |  |  |  |  |  |  |  |
| 0.3 |  |  |  |  |  |  |  |  |
| 0.2 |  |  |  |  |  |  |  |  |
| 0.1 |  |  |  |  |  |  |  |  |
| 0 |  |  |  |  |  |  |  |  |

## Experiment 2 - focus effects



## Experiment 2 - focus effects

```
+0.60 VOP
```

$+0.50$
$+0.40$
+0.30
+0.20
+0.10
object topic -
wideNP focus
$-0.10$
$-0.20$
$-0.30$
$-0.40$

## Experiment 2 - focus effects



Experiment 2 - focus effects $\begin{gathered}\mathrm{r}=-0.383 \\ \mathrm{~b}=0.37 \\ \mathrm{p}=0.00001\end{gathered}$

## Future Directions

- explore effects of frequency (of V, P, VP)
- test interaction between weight and topic/focus
- Head raising of the particle [PredP $\underbrace{\text { P-p-Pred }\left[p p ~ O B J E C T ~\left[p^{\prime}\right.\right.} \underbrace{\text { P-p [pp P }]]]]}$
- Old information object contexts cut [TopicP [DP the tree] [TOPIC] [Topic' ${ }^{\prime}$ Topic [PredP [DP the tree] down]]]
- Narrow object focus contexts cut [TopicP down ${ }_{\text {[TOPIC] }]}^{\text {[Topic }}{ }^{\prime}$ Topic [PredP the tree down]]]


## Variation in Grammar and Usage


adapted from Cappelle 2009

