

Impact of on-pack information on consumers' understanding of expiry dates and food waste behaviour. Insights from a real-life experiment in The Netherlands

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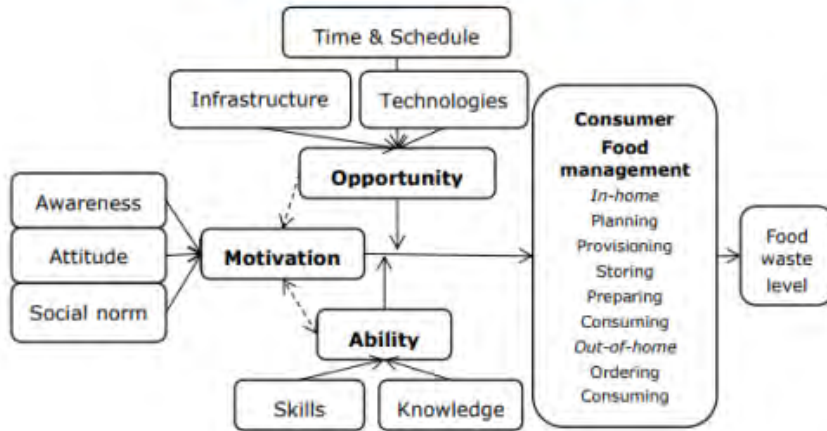
Background 1

- Dutch households responsible for 25-35% of wasted food in The Netherlands
- It is estimated that ~10% of household food waste is due to misunderstanding of date marking terminology
 - 'Best before' vs. 'Use by'
- Focus area of European Farm-to-Fork strategy (2020)
- **Motivation for Dutch Green Deal 'over de datum' (2017)**
 - Aim: Reduce food waste by increasing consumer understanding regarding date labelling
 - One of the strategies: extra information on product packages



Background 2

Consumers Food Waste Model



Van Geffen et. al, 2016

- Food waste generation in households is a complex (often unconscious) process
- Previous online study showed that extra information (visual cue + text) can help consumers, both for best-before and use-by 'products'

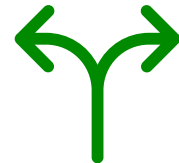
What are the effects
in a real-life
situation?



VICO study – research questions

What's the effect of extra date-marking information on consumers' understanding of date labels and their food waste related behaviours in a realistic setting?

- Do consumers notice the extra information about expiry dates on the product packages (when it is realistically sized)?
- Does the extra information lead to a better understanding of (the difference between) use-by and best-before dates?
- Does the additional information impact the choice behaviour of consumers?
 - Use products past the best-before date (less food waste)?
 - Discourage use of products past the use-by date (food safety)?



Design VICO-study

1. Food preparation task (cover story): “Make a varied snack platter with as much products as possible as long as they are still good to eat”

- 12 products (6 use-by, 6 best-before) in original package with fictitious expiration date (before/on vs. past date; within-subjects)
- Expiration data stickers with or without extra information (cue vs. no-cue group; between-subject design)



2. Individual survey & 3. Group discussion where snack platters were served and consumed

- Reflection on preparation task
- Understanding use-by & best-before
- Recall, understanding & appreciation of the extra information





Products and expiry dates

Date type	Product	Date (adapted per test day)
Use-by	Smoked Salmon	Not expired 26.01.2023
	Snack carrots	Not expired 26.01.2023
	Sweet peppers cream cheese	expired 25.01.2023
	Chicken skewers	expired 25.01.2023
	Fresh mango pieces	expired 24.01.2023
	Fresh tzatziki	expired 24.01.2023
Best-before	Olives (in glass)	Not expired 02.02.2023
	Almonds	Not expired End 02.2023
	Hummus	expired 23.01.2023
	Brie	expired 23.01.2023
	Fuet (dry-cured pork sausage)	expired 19.01.2023
	Toasted bread sticks	expired 22.12.2022



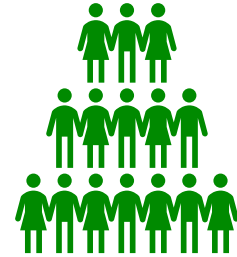
Date stickers with extra info – as realistic as possible

Date type	Extra information	Examples	
		<i>Cue</i>	<i>No-Cue</i>
<p data-bbox="115 327 367 414">Use-by</p> <p data-bbox="115 414 367 611">Use before or on date. Do not use after date.</p> 			
<p data-bbox="115 611 367 698">Best-before</p> <p data-bbox="115 698 367 886">Often good after date. Look, smell and taste.</p> 			



Participants

- 42 consumers
- On average: 32.1 years (range 20-48)
- Majority women (76%) and high educated (71%)
- No differences between cue and no-cue group



Cue group: N=19

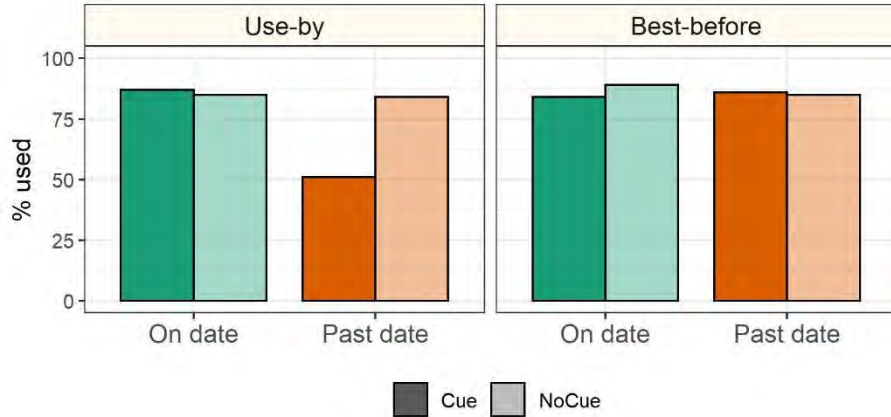
No-cue: N=23



Results



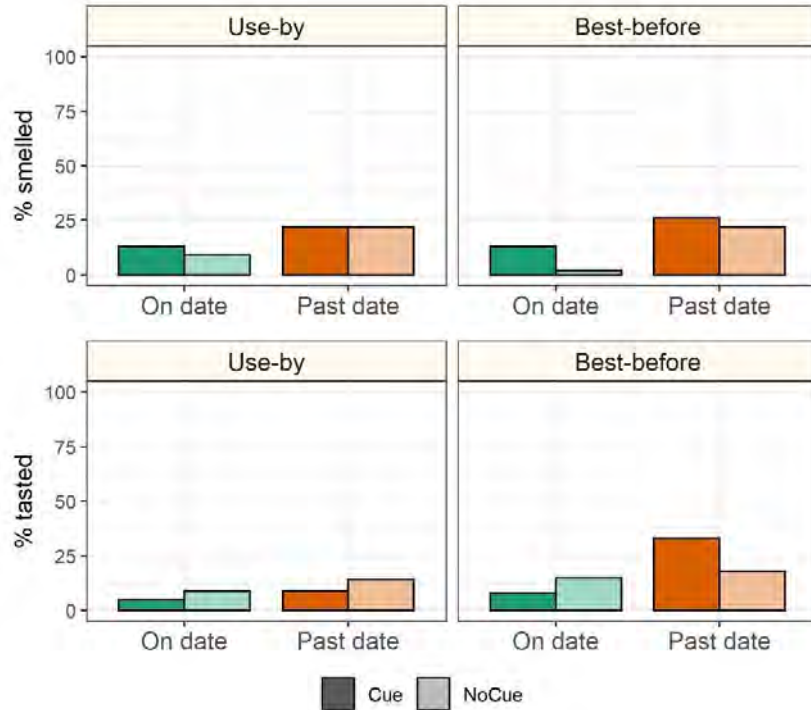
Snack platter task: product choices



- Extra information elicited different behaviour for use-by and best-before
- Date x Date type x Group ($p=.018$)*:
Only Cue-group makes distinction between use-by and best-before
 - Cue-group more likely to discard products past the use-by date
 - Cue-group not less likely to discard products past the best-before date → Probably due to ceiling?
- Expired products more often used than discarded

* Linear mixed-effects regression

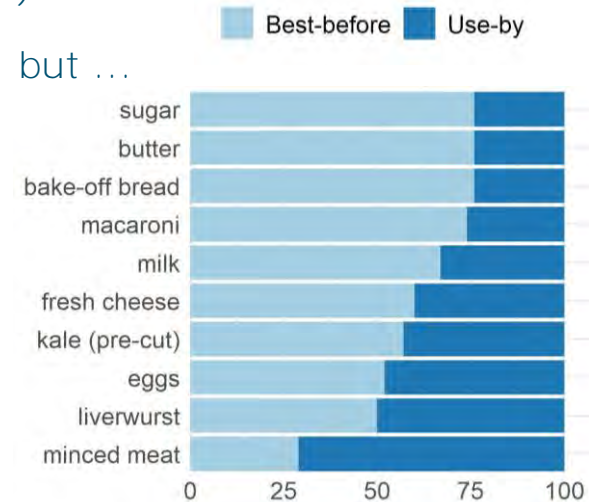
Snack platter task: smell and taste behaviour



- Products usually not smelled/ tasted
- Date-effect for smelling ($p=.007$):
Participants more likely to smell expired products than non-expired products (23% vs. 9%)
- Date type-effect for tasting ($p=.020$):
Participants tasted best-before products more often than use-by products (21% vs. 10%)
- Effect of extra information?
Cue group tasted products past best-before date more often than no-cue group (33% vs 18%), but interaction was not significant
Pattern of individual products suggests a positive effect of extra date-marking information, but not for all products



Understanding Use-by & Best-before

- 86% of participants states to know the difference between use-by & best-before
- Sorting task (dragging products in use-by or best-before box)
 - No single product unanimous use-by or best-before, but ...
 - for 41 participants (98%): sugar = pasta (macaroni)
 - for 40 participants (95%): sugar \neq minced meat
- Good understanding of difference between perishable and non-perishable products, but not based on date-marking terminology
 - A quarter of participants confuses the two terms
 - No difference between the two groups \rightarrow Cue did not affect date-marking understanding



Extra information: recall, understanding, appreciation

- 25% recalled the symbols in cue-group; Majority did not (consciously) notice the visual icons during the task
 - 3 participants recalled both cues

		Cue N=19	NoCue N=23	ALL N=42
	N	5	1	6
	%	26	4	14
	N	5	0	5
	%	26	0	12

- Majority appreciated the extra information to determine what to do with products past the expiry date
- Textual information more appreciated than visual information (Focus Group: preferable both)
 - Best-before icon better understood and more appreciated than use-by icon

Discussion



■ Extra date-marking information on product packages is effective

- Elicits differential behaviour for use-by and best-before products
- Encourages desired behaviour from food safety perspective (products past use-by date more often discarded)
- **No evidence for desired food waste reduction effect in this study, but ...**
 - Ceiling effect (best-before products hardly discarded) → expiry period too short? Conscious sample?
 - Other factors besides expiry date played a role
- Seems to have positive effect on use of senses (→ more research needed)



■ Behavioural effects occurred irrespective of consumers' understanding of date-marking terminology

- Focus on the associated action (what to do with expired products) seems more important than understanding terminology



Conclusion

- Extra date-marking information on product packages can influence consumer behaviours in a realistic setting
- Extra date-marking information has potential to help consumers in making a difference between use-by and best-before
- No (direct) effects on consumer understanding → Information should focus on the behavioural action: What to do with expired foods?



Thank you!
Thanks to the team!

Questions?

[Report](#), factsheet en [news message](#)
(in Dutch)

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