Investigating beachgoer's perceptions of coastal bathing risks in South-West France

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Investigating beachgoer's perceptions of coastal bathing risks in South-West France

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Do beachgoers underestimate bathing risks ?

Some evidences in the Beach Safety literature (but not that much either)

- ✓ Gender and age (Mc Cool et al. 2008, 2009)
- ✓ Frequency of visits, swimming competency (Mac cool et al. 2008) ⇔ underpin self control or self habituation feelings ?
- ✓ Confirmation bias (Ménard et al. 2018)

Mixed evidences in research on outdoor recreation and natural hazards

- ✓ Why should they underestimate risks?
  - ➢ Because of expected positive outcomes and the intentional nature of the activity (Barnett & Breakwell 2001)
- ✓ Why should they **not** underestimate risks?
  - ➢ Because they are not 'experts' (Siegrist & Gutscher 2006, Ebert & Durback 2022)

Beyond **social** and personal factors

- ✓ Do natural factors also influence risk perceptions ? (Kamstra et al. 2019)

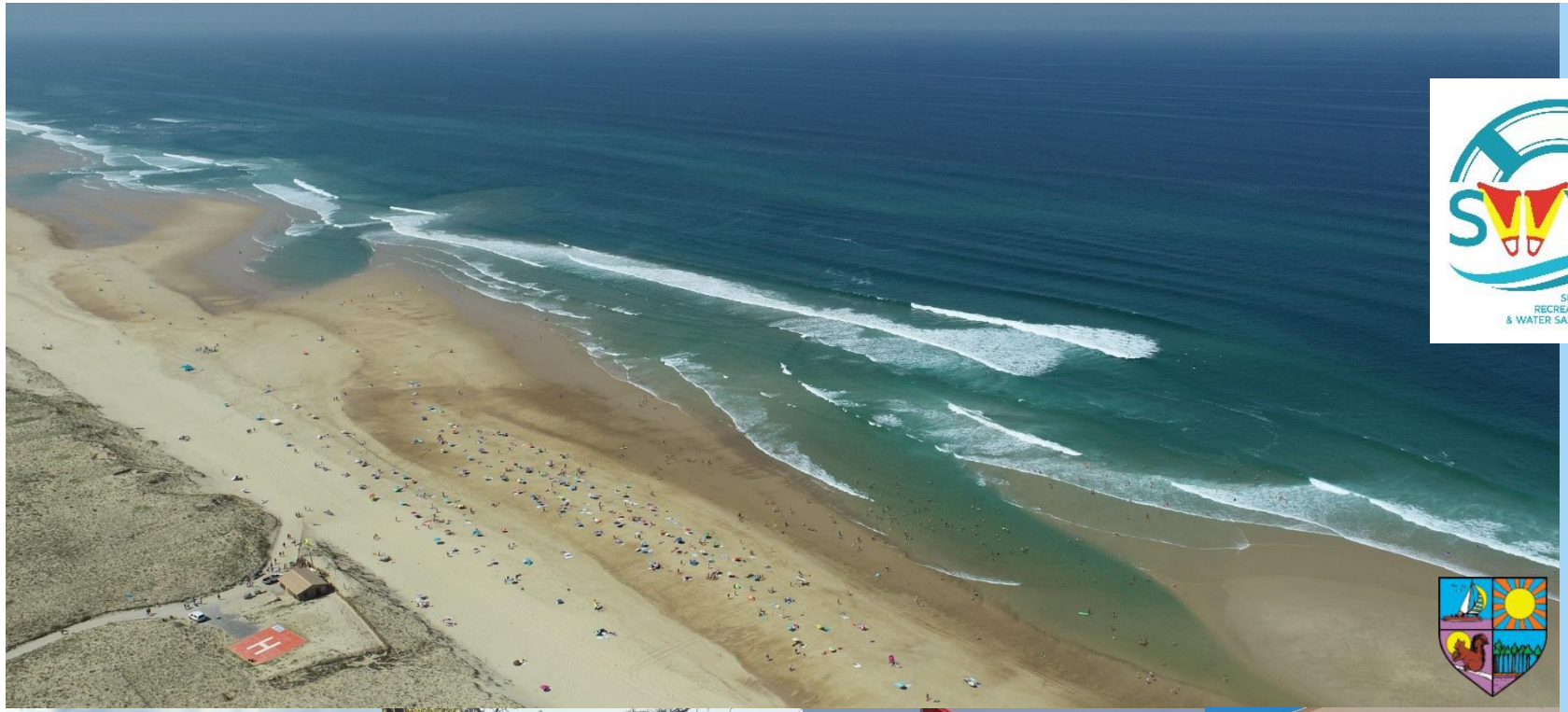
Our question

What are the individual and environmental factors that influence beachgoers risk perceptions ?

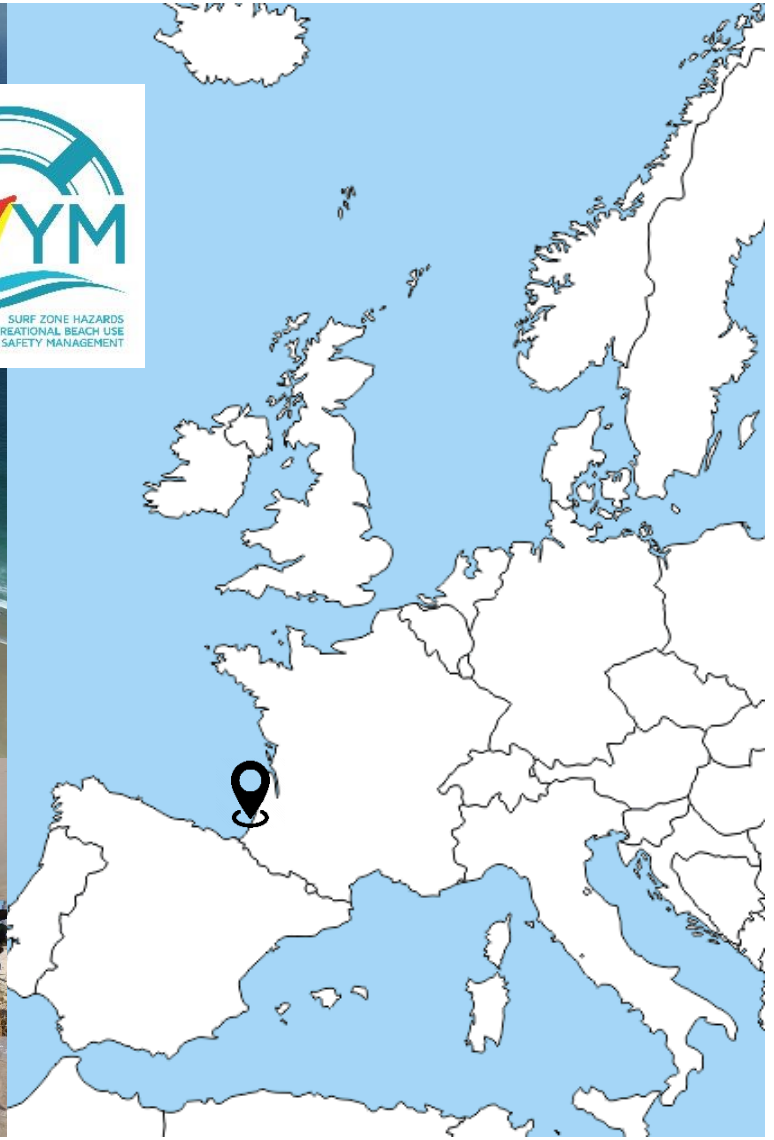
Related issues

- ✓ Do beachgoers make a difference between **Rip current (RC)** and **Shore Break (SB)** risks?
- ✓ What do **beachgoers'** and **lifeguards**' perceptions have in common?

Our study site: la Lette Blanche in SW France



SURF ZONE HAZARDS
RECREATIONAL BEACH USE
& WATER SAFETY MANAGEMENT



Methods – Data collection

Unique multidisciplinary database (July-August 2022)

Data set 1: Beachgoers survey

- ✓ Face to face interviews, 40 days, 722 individuals
- ✓ *Incl*. questions on sociodemographic (2), preventive actions (1), exposure and experience (5), attitude (2) risk assessment (7)

DATE TIME

Data set 2: Environmental conditions

- ✓ Waves (3)
- ✓ Weather (2)
- ✓ Tide level

Data set 3: Lifeguards assessment

- ✓ Hourly RC hazards
- ✓ Hourly SB hazards
- ✓ Affluence

Methods – Risks assessment

Beachgoers risk assessment

*"Using a scale from **0 to 4**, 0 being the minimum and 4 being the maximum, do you think it is dangerous to go swimming **now**?"*

*"by differentiating between the risks applicable **to you**, to the **accompanying adults** (if any) and to the **accompanying children** (if any)"*

*"by differentiating between the **rip currents**, the **shore break** waves as well as **overall risk** "*

7 estimations / survey

Lifeguards hazard assessment

*"Using a scale from **0 to 4**, how hazardous do you think the **rip current** is at the moment"*

*"Using a scale from 0 to 4, how hazardous do you think the **shore break wave** is at the moment"*

2 estimation / hour

On site survey – environmental conditions

Monday July 11th 2022 | 11:30

H_s = 0,37 m
T_p = 8,35 s
θ = 307,7

Wind = 2,9
Sun = 60
Tide = +0,56 m

Saturday August 20th 2022 | 17:00

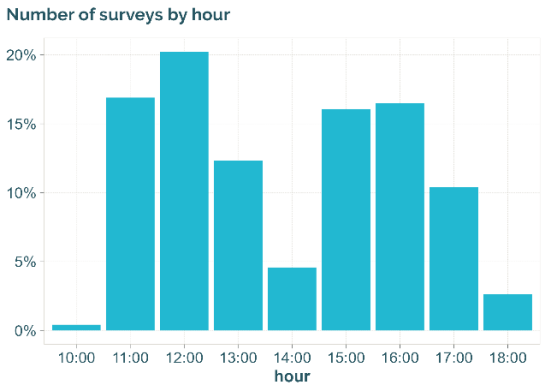
H_s = 2 m
T_p = 13,08 s
θ = 297,2 °

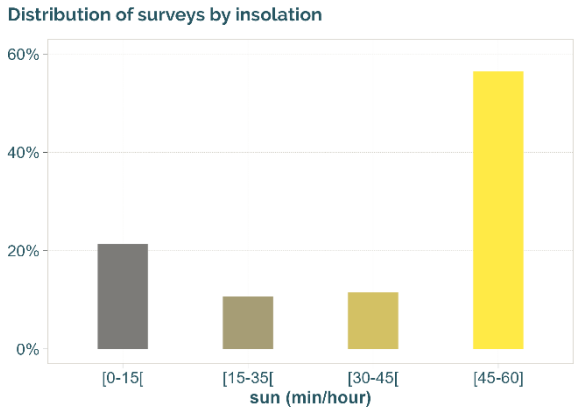
Wind = 4,2
Sun = 39 min
Tide = -0,56m

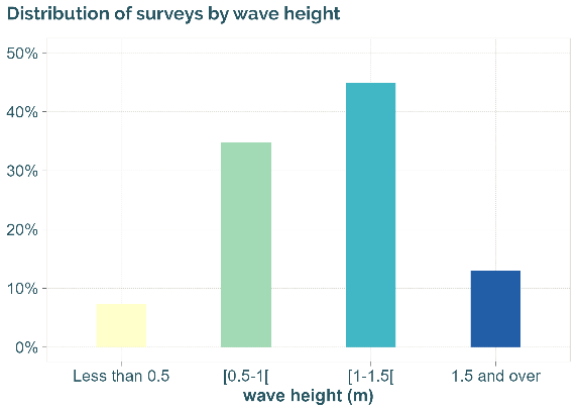
Methods – Data analysis

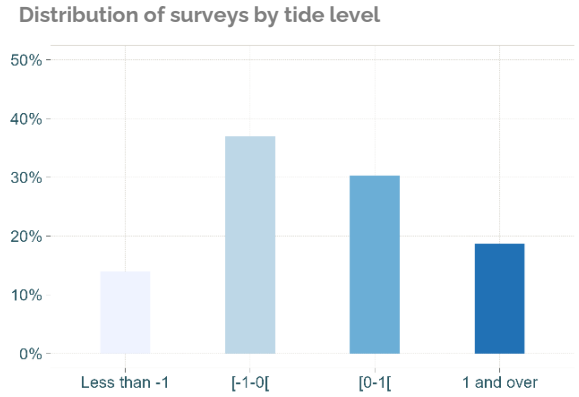
Method	Hypothesis
Frequency	describe sample
Mann-Whitney U test	differences between individual risks assessments
GLM (ordered logit)	predictors of individual risk assessment
Kendall Tau rank correlation coefficient	correlation between RC and SB risks, between beachgoers and lifeguards assessments

Results – Sample statistics





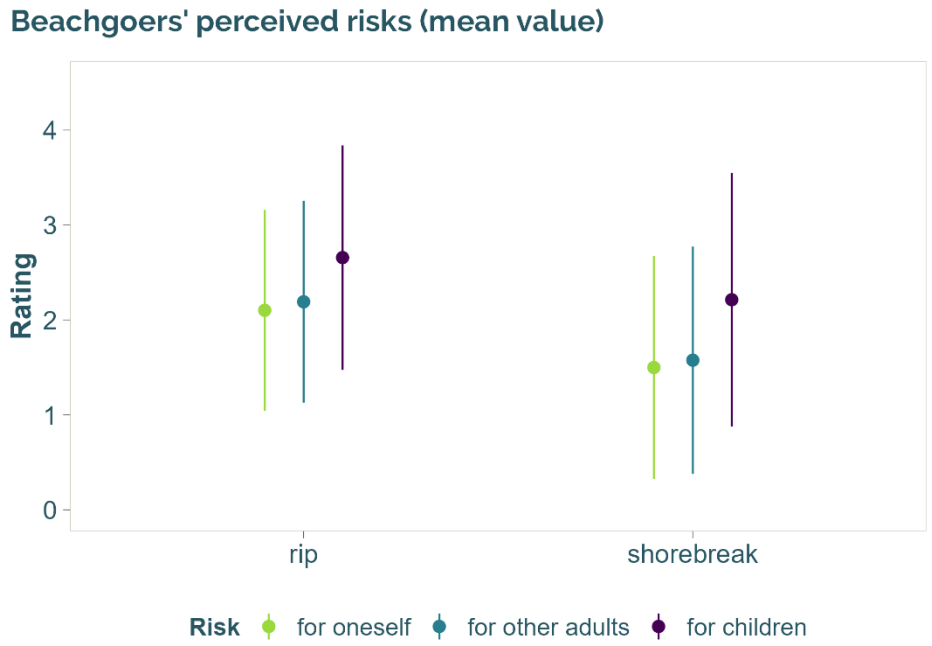




Variable	Category	%
Gender	Female	53.8%
	Male	46.2%
Age (years)	15-29	25.0%
	30-44	30.0%
	45-59	24.6%
	60+	20.4%
Attitude about drowning in general	Mean score (median)	5.5 (6)
Concern about rip current escape	Very anxious or anxious	37.7%
	Uncertain	38.8%
	Confident or very confident	20.4%
Beach frequency	only in summer	58.6%
	all the year round	41.4%
Previous visit at la Lette Blanche	This is the first time	25.6%
	I come sometimes	21.3%
	I come often	53%
Surfer/bodyboarder/bodysurfer	Yes	26.6%
Swimming ability in the sea	Mean score (Median)	5.77 (6)
Has been caught by rip currents	Yes	30.2%
Has been hit by a shore break wave	Yes	51.8%
Survey's timing	Upon arrival	61.1%
	Upon leaving	38.9%

Results – beachgoers risks assessment

		RC Risk	SB Risk	Risks comparisons (signif.)
	For oneself	2.10	1.50	*** Large effect
	For other adults	2.19	1.58	*** Large effect
	Children	2.66	2.07	*** Moderate effect
Vulnerability comparisons (signif.)	one self versus other adults	*** Weak effect	*** Weak effect	
	one self versus children	*** Large effect	*** Large effect	
	other adults versus children	*** Large effect	*** Large effect	



Key results

- beachgoers judge rip currents risks to be higher than shore break waves risks
- Identification of an optimistic bias (risk “oneself” < risks “others”)
- kids are deemed to be highly vulnerable

Results – beachgoers risks models

		RC	SB
	Variables	coef (signif)	coef (signif)
Constant term	0|1		
	1|2		
	2|3		*
	3|4	***	***
Socio demographics	GenderWoman	***	***
	age[25-39 yrs]		***
	age[40-54 yrs]	***	***
	age[55-65 yrs]		
	age[65 + yrs]		**
Attitudes / concerns about drowninf	GeneralDrown_Concern		***
	Rip_Escape_Confident	*	
	Rip_Escape_Uncertain		
Water based activities	Beach_summerOnly	**	***
	Lette Blanche_often	**	
	Lette Blanche_sometimes		
	Surf_Yes		***
	Ocean_Swim_Hability		
Hazards experience	Rip_yes/ SB_Yes		*
	Survey_Arrival		
Environmental conditions	Wave Height Hs	***	***
	Wave period Tp	***	***
	Wave dir		
	Wind_speed		
	Insolation		
	Tide level		***

Positive influence

Negative influence

Significance level *5%, ** 1%, ***1‰

Key results

Individual factors

- **Women**, **older** people declare **higher** perceived risks
- People **afraid of drowning** declare **higher SB** risks
- People **confident** about rip escape declare **lower RC** risks
- **Occasional** beach users declare **higher** perceived risks
- **Locals** declared **higher RC** perceived risks
- **Surfers** declare **lower SB** perceived risks
- People **hurt** by SB declare **lower SB** perceived risks

environmental factors

- The **larger Waves** Hs & Tp are, **the higher** RC and SB perceived risks
- Beachgoers declare **higher SB** perceived risks at **high tide**

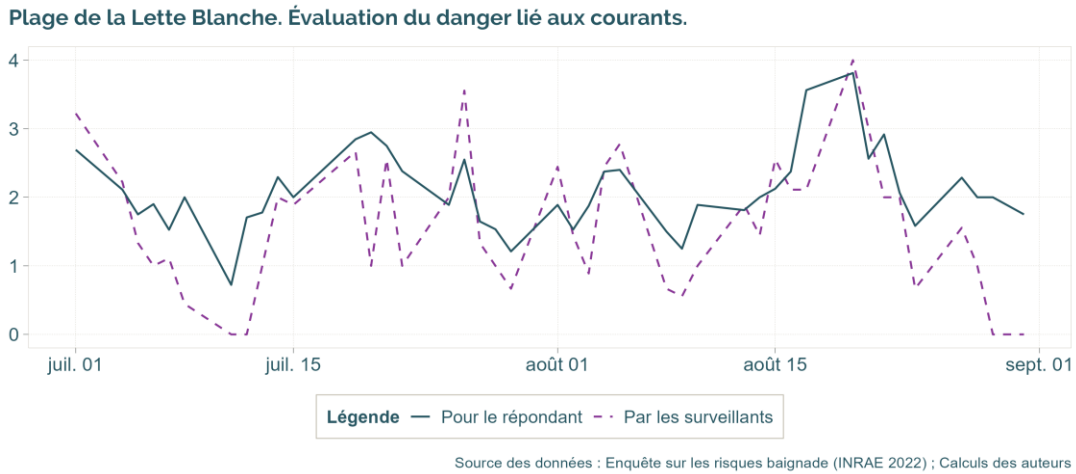
Results – Risks assessments correlation

Kendal rank correlation tau

	BG_Global	BG_Rip	BG_SB	LG_Rip	LG_SB
BG_Global	1.00	0.61***	0.51***	0.25***	0.23***
BG_Rip		1.00	0.47***	0.263***	0.17***
BG_SB			1.00	0.13***	0.29***
LG_Rip				1.00	0.09**
LG_SB					1.00

Significance level *5%, ** 1%, ***1‰

Example of time series : BG and LG RC daily mean perceived risks



Key results

- Beachgoers RC and SB risks perceptions are correlated
- Beachgoers specific-domain risk perception are strongly correlated with “overall” risk assessment
- For RC and SB, beachgoers and lifeguards assessments are correlated (though LG>BG)

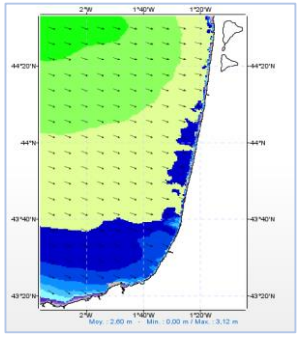
Discussions

Beachgoers estimated **rip current risks to be higher than shore break waves risks**

- Need to inform about SB dangers

Domain related risks and overall bathing risks are **strongly correlated**

- **Cons**: possible misunderstandings
- **Pros**: deliver a single warning message (“bathing is dangerous”).



Both **individual and environmental** factors affect beachgoer's risk assessment

- Influence of individual factors => **confirm** many existing results
- Some individuals (e.g. surfers) may become **quasi-experts** (Kamstra et al. 2019)
- Influence of **waves** and **tide** level observed on site ⇔ **context dependent** assessment

Beachgoers and lifeguards judements have (at least partly) **similar components**

- Make **communication** easier ?
- A **5 level rating scale** is efficient (better than 3 colours flags?)

Discussions – How to go further ?

- ✓ Reduce **sampling** bias (single site, supervised beach)
- ✓ Include **relational** dimension of risk assessment (« How others are doing ?»)

➢ **upcoming surveys** in 2024

- ✓ Compare **risks with risk** (and not with perceived hazards)
- ✓ How beachgoers **perceived** environmental factors (e.g. waves size) ?

➢ However it actually **works** !

- ✓ Do risk assessment helps in **predicting beachgoers behaviour**?

➢ spoiler: **YES** ☺