



Percezione applicata e progettazione

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PSICOLOGIA AMBIENTALE

Quanto siete consapevoli del consumo d'acqua?

Scrivere su un foglio, individualmente:

- Quanti litri d'acqua occorrono mediamente per una doccia?
- Quanto costa una doccia?
- Quanta acqua consumiamo mediamente in un giorno?

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Doccia: 50-80 litri
Costo: circa 0,10 Euro



Italia: 241 litri
Nord Europa: 180-190 litri

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Gestione della domanda d'acqua → promuovere comportamenti "water saving" in modo da ridurre la media del consumo d'acqua e promuovere un consumo sostenibile (Brooks, 2002; 2006).

→ - atteggiamenti, opinioni e comportamenti dei consumatori

Comportamento individuale → elemento chiave (Willis et al. 2011)

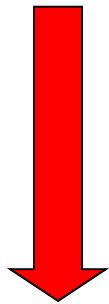
→ Analisi del punto di vista dei consumatori: percezione del consumo di acqua domestica e opinioni sull'utilizzo di risorse idriche

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Gestione della domanda d'acqua

Quali strategie per promuovere un utilizzo sostenibile dell'acqua e per aumentare la consapevolezza dei consumi?

- Pricing e non-pricing strategies



Tipi di tariffe, sconti



Restrizioni, formazione, tecnologie

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Gestione della domanda d'acqua

- Strategie raramente efficaci nel promuovere modifiche comportamentali e nell'aumentare la consapevolezza del consumo d'acqua (Rockaway et al., 2011)



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La ricerca suggerisce che i consumatori non sono consapevoli del volume d'acqua consumata quotidianamente (i.e. Miller & Buys, 2008)

Survey



Non misura direttamente il consumo individuale

Suscettibile di desiderabilità sociale

Stima del consumo domestico



Ragionamento "astratto"

Influenza di conoscenze pregresse

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Percezione diretta del consumo d'acqua



- Osservazione diretta del flusso d'acqua → esperienza concreta
- Assenza di desiderabilità sociale
- Effetto limitato di conoscenze pregresse



Networking for Drinking Water Supply in Adriatic Region **DRINK ADRIA**



16 partners from 8 Countries

Create a network to share
competences, expertise and operational
practices in the field of sustainable
water resources management

Funded by
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Quanto siete bravi a stimare il flusso d'acqua?

Scrivere su un foglio, individualmente:

- Quanta acqua esce
- Per quanto tempo il rubinetto è rimasto aperto

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Video 1 → 10 secondi, 3 lt/sec = 0,50 lt

Video 2 → 10 secondi, 7 lt/sec = 1,17lt

Video 3 → 10 secondi, 12 lt/sec = 2 lt

Video 4 → 10 secondi, 12 lt/sec = 2 lt

Video 5 → 10 secondi, 7 lt/sec = 1,17lt

Video 6 → 10 secondi, 3 lt/sec = 0,50 lt

Experiment 1 - Aim

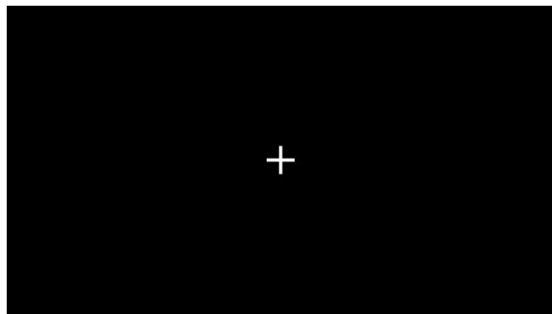
AIM: to investigate the individual perception of the sensorial experience related to water flow.

→ we examined whether participants were able to estimate the volume of water supplied by a domestic tap, by manipulating both the volumetric flow rate and the temporal interval during which the tap supplied water.

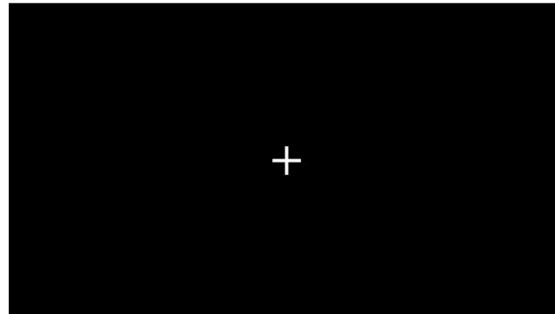
HYPOTHESIS: occurrence of perceptual bias, which could explain the difficulty in estimating the actual water consumption.

Experiment 1 - Stimuli

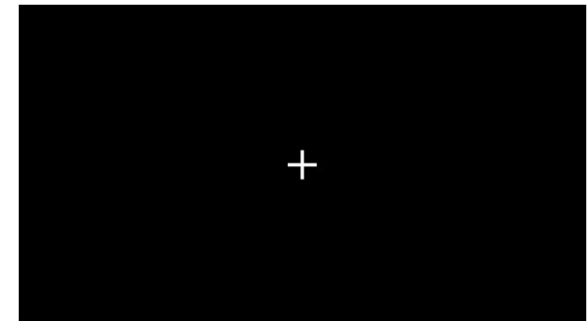
- We recorded nine videos, which showed the water flow supplied by a domestic tap;
- Each video started by showing the hand of a volunteer turning the tap on, and finished by showing the same hand turning the tap down.
- We manipulated both the **flow rate** and the **duration** of the water flowing



Low flow rate



Medium flow rate



High flow rate

Experiment 1 - Method

11 university students ($M = 21 \pm 2,1$)

A within–subjects experimental design was employed with two independent variables: Flow Rate and Duration.

Flow Rate: three conditions (Low, Medium and High), according to the total volume of water supplied per unit time (that is, liters per second).

Duration: Three conditions (10s, 20s and 30s) according to the duration of water flowing

Experiment 1 - Method

4 repetitions of the experimental session – 9 videos in counterbalanced order

TASK:

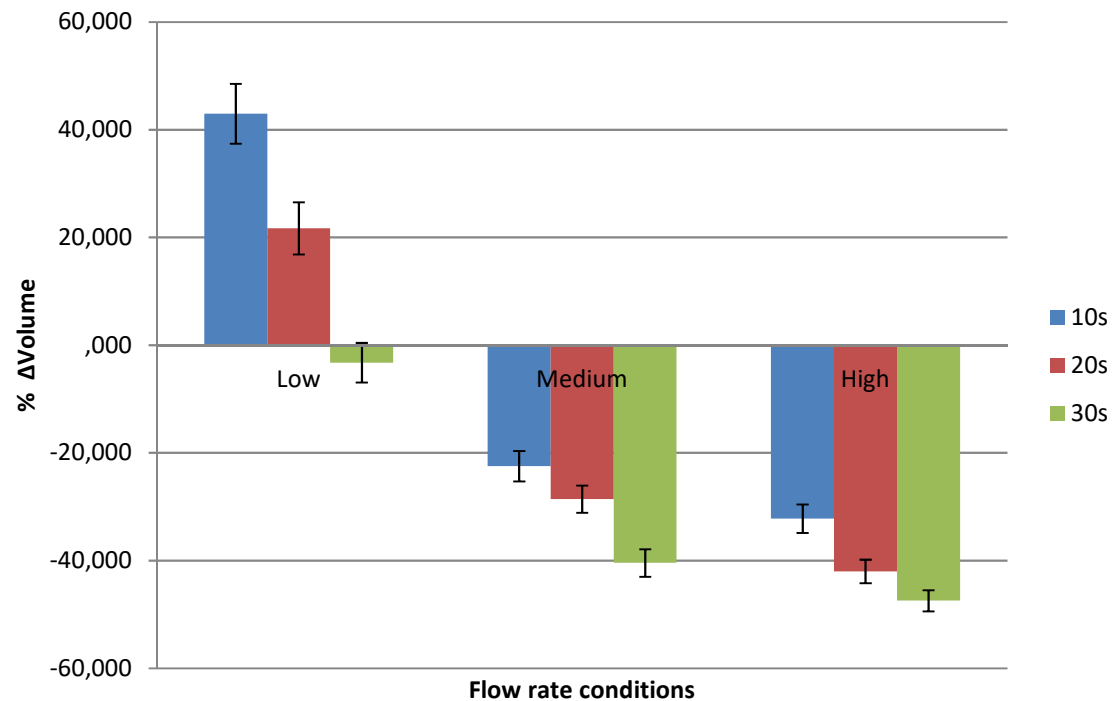
- Watching each video, while performing an interfering task – that is repeating the same syllable aloud, i.e. “la-la-la-la...”.
- Reporting one's own estimation of the total volume of supplied water and the temporal duration of water flowing

→ the percentage value of Δ Volume and Δ Time,

Δ = estimated values – actual values

Experiment 1- Results

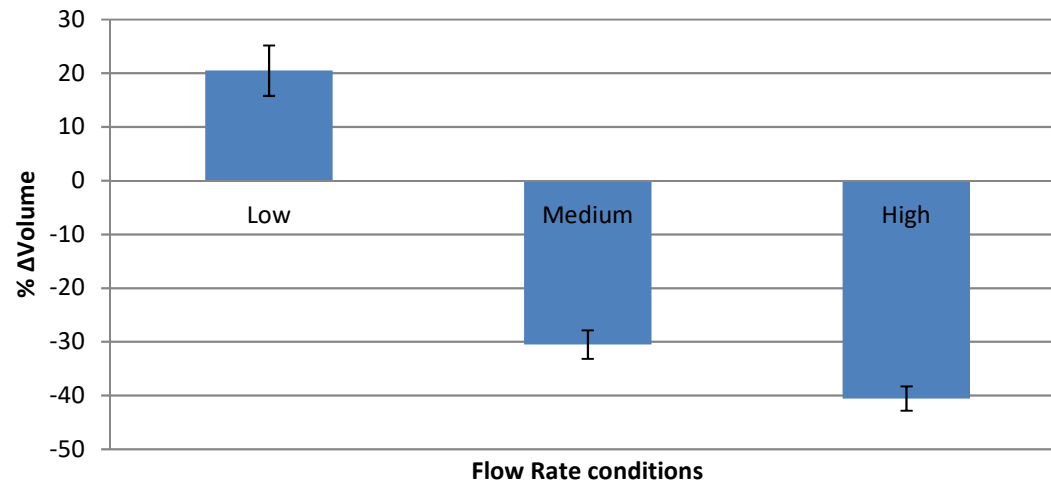
A 3 (Flow Rate) x 3 (Duration) repeated measure ANOVA



Flow Rate ($F = 36,453$; $p < .001$; $\eta^2 = .785$), Duration ($F = 16,898$; $p < .001$; $\eta^2 = .628$), and interaction ($F = 3,556$; $p < .05$; $\eta^2 = .262$).

Experiment 1- Results

Flow Rate Variable



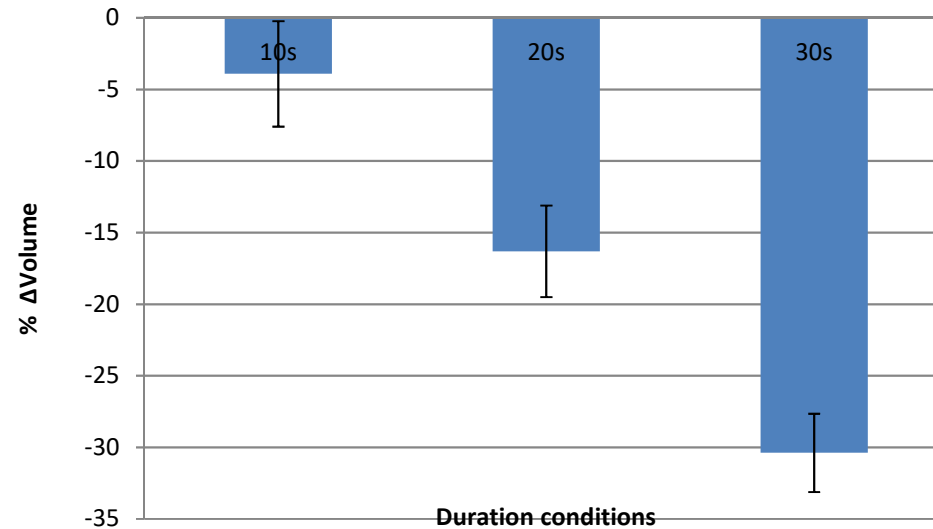
Low vs. Medium ($p < .001$); Low vs. High ($p < .001$); Medium vs. High ($p < .05$)

→ Participants underestimated the volume of flowing water and underestimation increased as Flow rate increased

Medium ($t = -3,785$; $p < .005$) and High ($t = -5,577$; $p < .001$)

Experiment 1- Results

Duration variable



10s vs. 20s ($p < .05$); 10s vs. 30s ($p < .001$); 20s vs. 30s ($p < .001$)

→ participants' underestimation significantly increase according to the increase of water flowing duration.

Experiment 1 - Discussion

- Participants were accurate in the perception of water volume only when water flow rate was low
- When flow rate was medium or high, participants reported a volume of supplied water inferior than actual volume
- Underestimation seems to worsen as water flow duration increases.



Influence of the features of sensorial experience, which may be not totally informative for non-experts.

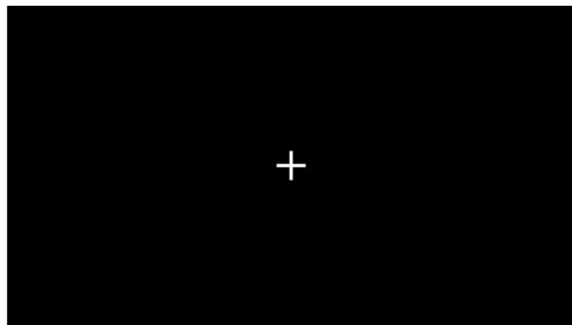
→ we added one more information in the videos, by framing also the sink

Experiment 2 - Method

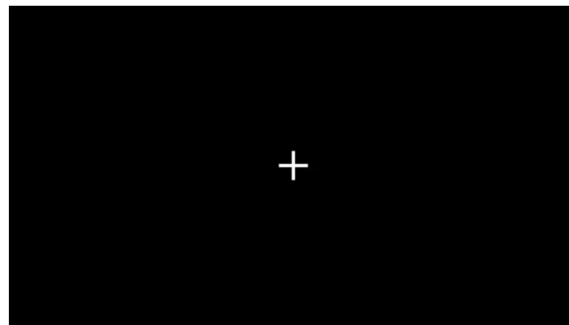
11 university students ($M = 22.09 \pm 2.94$)

Same procedure and experimental design of Experiment 1

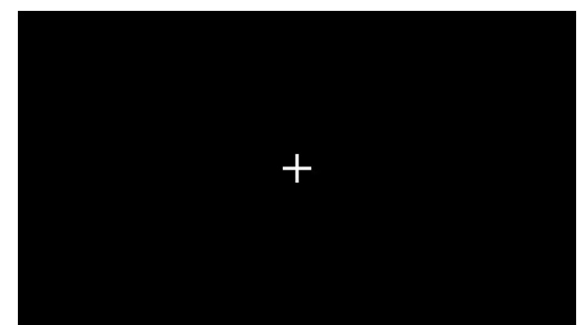
→ we framed also the sink



Low flow rate



Medium flow rate



High flow rate

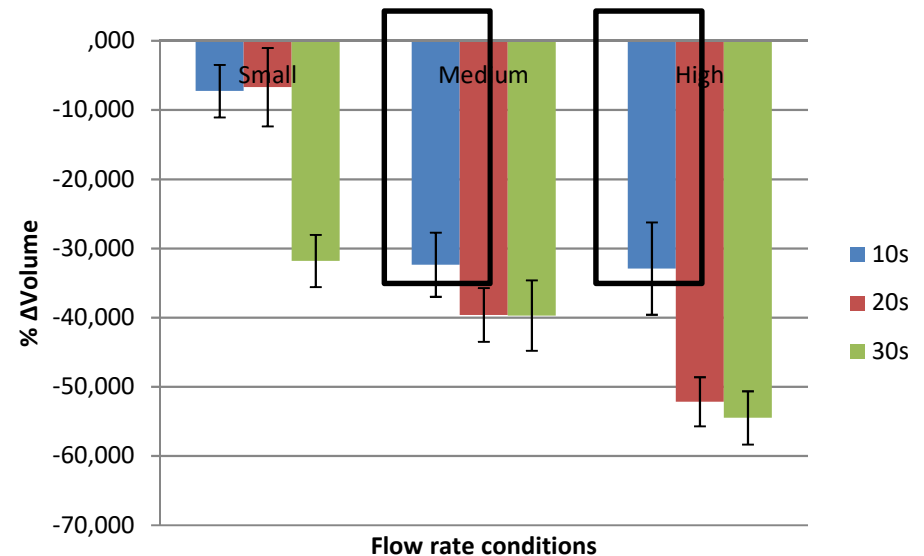
Experiment 2 - Results

Repeated measure ANOVA: Flow Rate ($F = 21,001$; $p < .001$; $\eta^2 = .677$), and Duration ($F = 8,170$; $p < .005$; $\eta^2 = .450$)

Same pattern of results than Experiment 1:

- Participants underestimated the volume of flowing water; underestimation increased as Flow rate and Duration increased
- In Low condition participants were accurate in the estimation of total volume of supplied water

→ in both Medium and High conditions participants performed accurately when executing the 10s condition (according to one sample t-tests)



General discussion

- People underestimate the total volume of water supplied by a domestic tap, even when the water in the sink can be seen
- The underestimation of volume of water supplied increases as a function of both flow rate and water flowing duration increase, worsening consumers' awareness of their actual consumption.
- Accuracy for low flow rate and for short time intervals

General discussion

Since our procedure limited the impact of social or other external pressures

→ water consumption underestimation is due to a perceptual bias which affects people's perception of the sensorial experience of water flowing

From an applied perspective:

The accuracy for short time interval when participants could see also the sink could be effectively employed to reduce the consumption of water, or at least to use consciously it