Application of Analytic Hierarchy Process for user needs elicitation. A preliminary study on a device for auto-injection of epinephrine

Leandro Pecchia, Jennifer L Martin, Arthur G. Money, Julie Barnet

27 March 2013

www.match.ac.uk

The MATCH partnership is core funded by the Engineering & Physical Sciences Research Council

Introduction

Problem description

- Epinephrine auto-injectors (Epipen) is used to treat severe anaphylaxis crises
- During trials Epipen performed well, reducing mortality, morbidity and hospitalization
- In real life its efficacy decrease for other than technical reasons:
  - patients do not always carry the device with them
  - If the Epipen was there was not used
  - Once used, it was used wrongly

Research Question

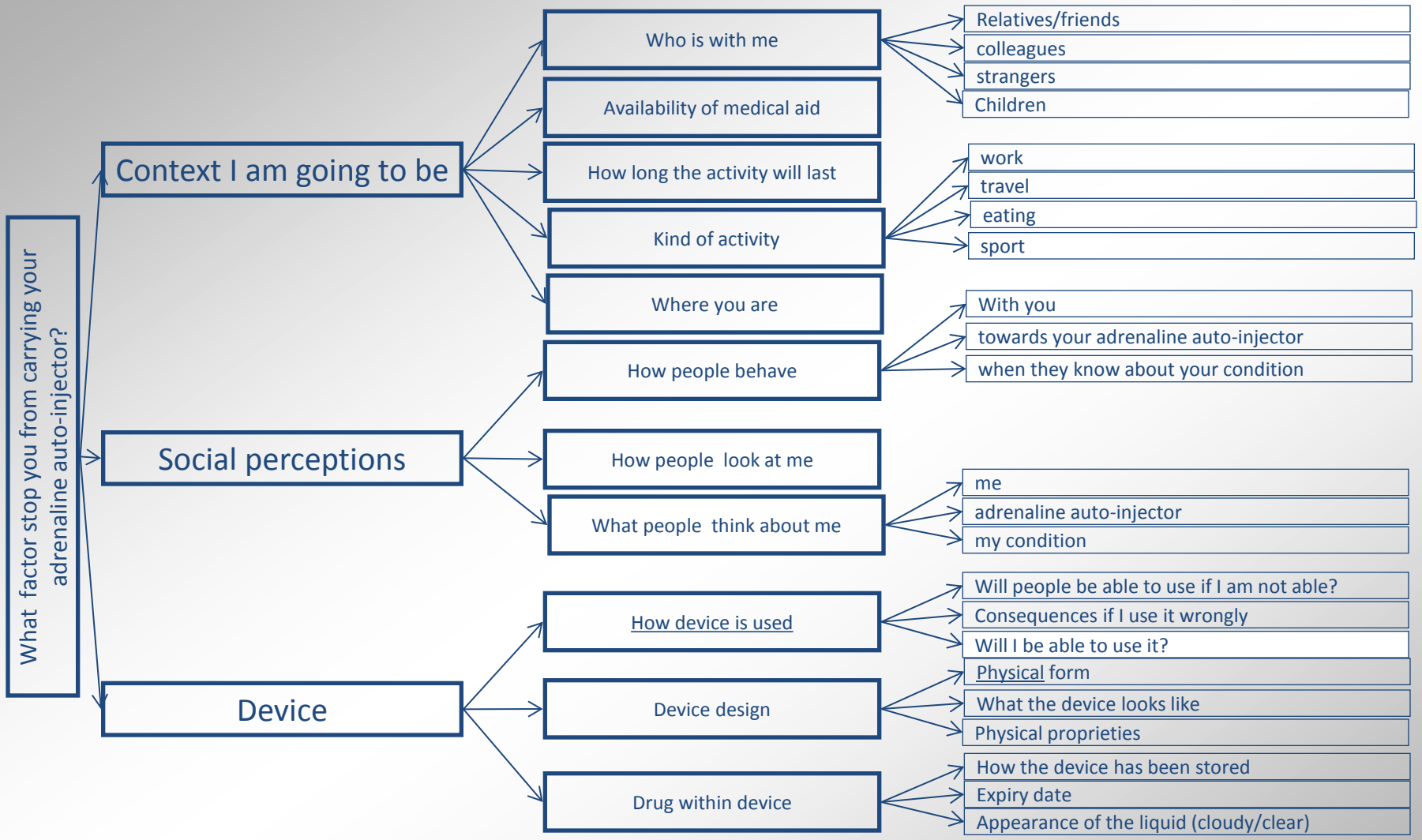
- Are there user needs that if properly considered will increase Epipen effectiveness

Goal of this study

- We aim to identify and prioritize User Needs that affect the decision of not carry the Epipen

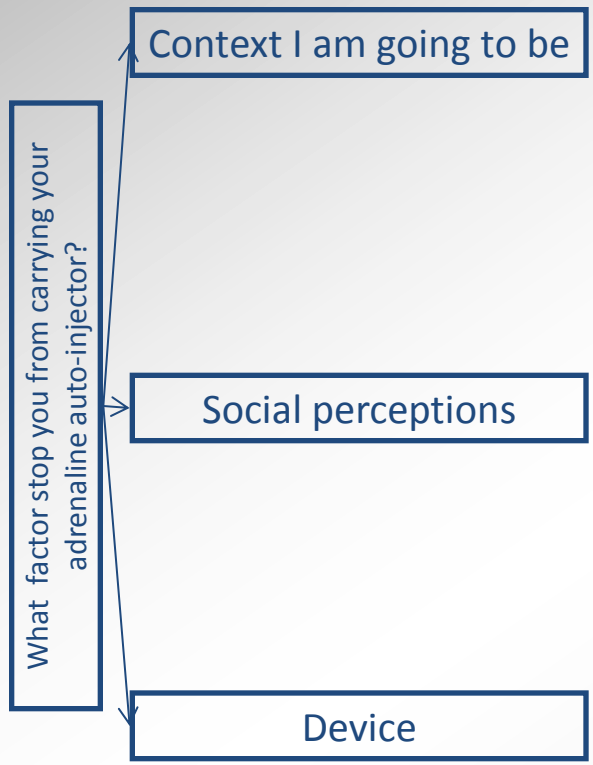
Result

Hierarchy of needs



Result

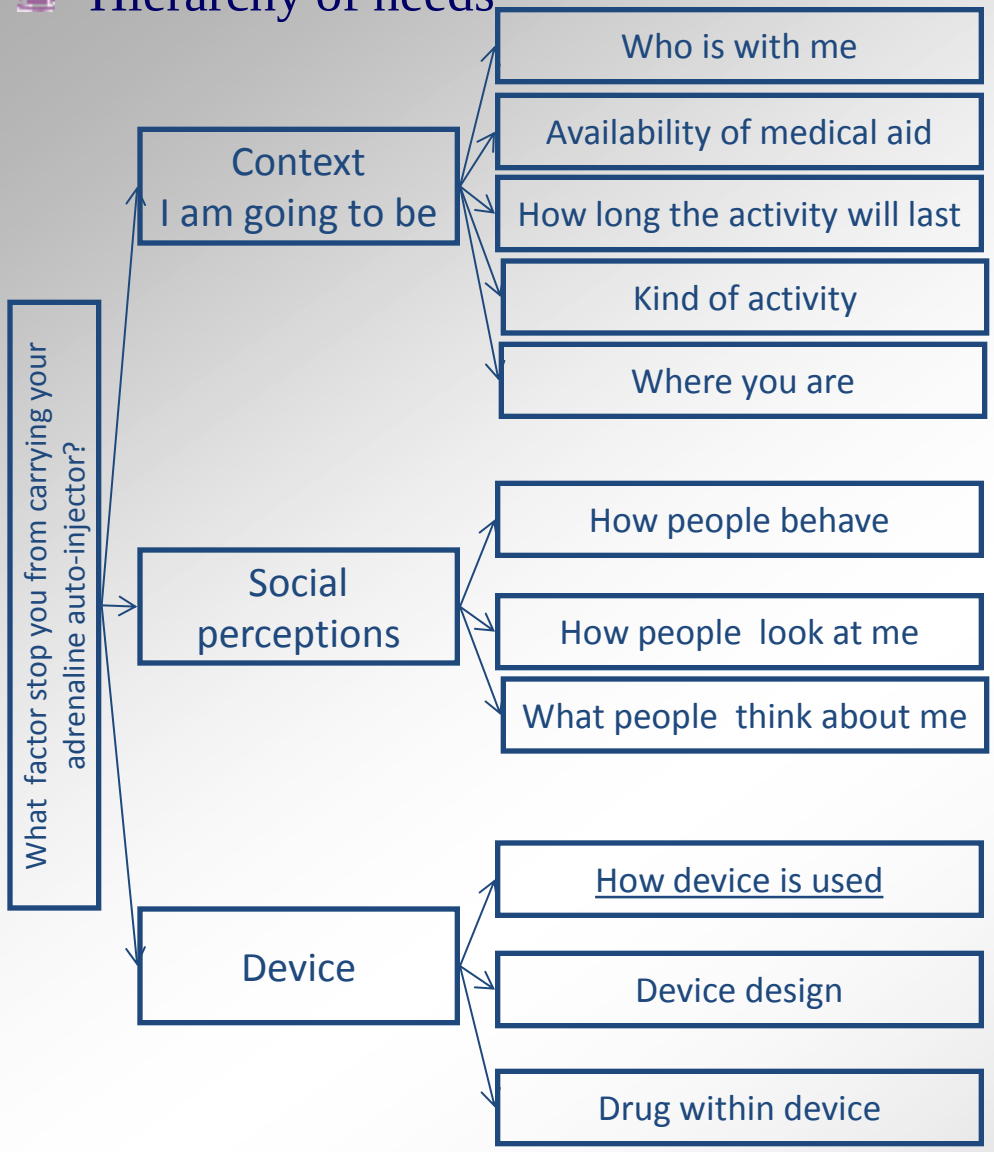
- Relative importance:



Category	GW	Rank
Context	0.40	1
Social perception	0.40	1
Device	0.20	3

Result

Hierarchy of needs



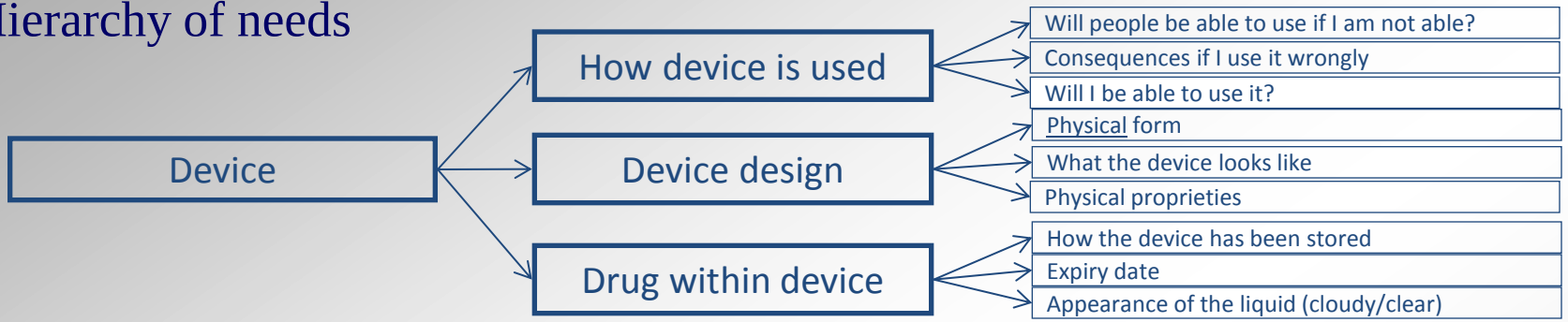
40%	LW		GW	
Who is with me	**0.27**	1	0.18	1
The availability of medical aid	**0.07**	4	0.05	10
How long the activity last	**0.13**	3	0.08	7
The kind of activity	**0.27**	2	0.18	1
Where I am	**0.27**	2	0.18	1

40%	LW		GW	
How people behave	**0.4**	1	0.16	4
What people think	**0.2**	3	0.08	8
How people look (me or my Epipen)	**0.4**	1	0.16	4

20%	LW		GW	
Device design	**0.14**	3	0.03	11
Drug within device	**0.57**	1	0.11	6
How device is used	**0.29**	2	0.06	9

Result

- Hierarchy of needs



Device design (17%)	LW	GW	Rank
physical form	**0,25**	0,04	8
how the device looks like	**0,25**	0,04	8
physical proprieties	**0,50**	0,07	6
Drug within device (57%)			
Expiry date	**0,57**	0,33	1
Appearance of the liquid (cloudy/clear)	**0,14**	0,08	5
How the devices has been stored	**0,29**	0,16	3
How device is used (29%)			
will I be able to use	**0,29**	0,08	4
Consequences if I use it wrongly	**0,57**	0,17	2
“Will people be able to use if I am not able?”	**0,14**	0,04	7

Conclusions

Problem description

- The AHP method may be useful to analyze, synthesize and represent user needs
- This representation can be more easily incorporated into medical device design.
- Increase user researches reliability
- Finally, qualitative information about the priorities of needs will complement the quantitative insight

Application of Analytic Hierarchy Process for user needs elicitation. A preliminary study on a device for auto-injection of epinephrine

Leandro Pecchia, Jennifer L Martin, Arthur G. Money, Julie Barnet

27 March 2013

www.match.ac.uk

The MATCH partnership is core funded by the Engineering & Physical Sciences Research Council