

VU Research Portal

Making sense of haptics

van Beek, F.E.

2016

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

van Beek, F. E. (2016). *Making sense of haptics: fundamentals of haptic perception and their implications for haptic device design*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam].

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

E-mail address:

vuresearchportal.ub@vu.nl

Contents

1	Introduction	1
	Static perception	11
2	Perception of force direction and magnitude	13
3	Perception of force direction	31
4	Perception of force magnitude and postural arm dynamics	39
	Dynamic perception	61
5	Discrimination of distance	63
6	The effect of damping on the perception of hardness	81
	Applications	105
7	Integrating force and position	107
8	Visuo-haptic biases in haptic guidance	129
9	General discussion	145
	References	155
	Nederlandse samenvatting	169
	Dankwoord	175
	About the author	179