

# Contents

## **Introduction: Editors' Introduction to Interacting with Presence**

Why "Interacting with Presence"? — 1

Structure of This Book — 2

An Introduction to Presence: Section 1 — 3

From the Body to the Technology to the Brain: Section 2 — 4

Experiencing the Others through a Technology: Section 3 — 5

Using Presence to Increase Wellbeing: Section 4 — 5

Individual Differences in Presence: Section 5 — 6

In Summary — 7

## **1 Extending the Self through the Tools and the Others: a General Framework for Presence and Social Presence in Mediated Interactions**

1.1 Introduction to Chapter 1 — 10

1.2 From Space to Action — 11

1.3 From Action to Presence — 13

1.4 From Presence to Social Presence — 17

1.5 The Evolutionary Role of Presence and Social Presence — 19

1.5.1 The Three Levels of Presence — 21

1.5.2 The Three Levels of Social Presence — 23

1.6 From Theory to Practice: the Development of Better Interactive Technologies — 24

1.7 Conclusion to Chapter 1 — 28

References — 29

## **2 Altered, Expanded and Distributed Embodiment: the Three Stages of Interactive Presence**

2.1 Introduction to Chapter 2: Presence and Three Categories of Embodiment — 32

2.2 Altered Embodiment: Changing Senses, Changing the World — 34

2.3 Expanded Embodiment: Embodiment without a Body? — 36

2.4 Distributed Embodiment: That's Me Over There! — 38

2.5 Our Future Embodiment(s): Challenges and Possibilities — 40

2.6 Conclusion to Chapter 2 — 42

References — 43

## **3 Measuring Presence in the Simulating Brain**

3.1 Introduction to Chapter 3 — 46

3.2 Background — 46

3.3 The Simulating Brain — 47

|          |   |           |
|----------|---|-----------|
| 3.4      | Presence in the Simulating Brain —                                      | <b>48</b> |
| 3.5      | Measuring What, How? —  | <b>50</b> |
| 3.6      | Previous Studies —  | <b>52</b> |
| 3.7      | Conclusion to Chapter 3 —   | <b>55</b> |
|          | References —  | <b>55</b> |
| <b>4</b> | <b>A Framework for Interactivity and Presence in Novel Bodies</b>       |           |
| 4.1      | Introduction to Chapter 4 —   | <b>57</b> |
| 4.1.1    | Extending Human Morphology In Novel Ways —                              | <b>60</b> |
| 4.2      | Body Schema and Extending the Body Functionality with Tools —           | <b>61</b> |
| 4.2.1    | Tool Use —  | <b>61</b> |
| 4.3      | Body Image and the Transfer of Body Ownership to Novel Bodies —         | <b>63</b> |
| 4.3.1    | Body Transfer and Body Ownership —                                      | <b>63</b> |
| 4.4      | Embodied Cognition and Virtual Environments —                           | <b>65</b> |
| 4.5      | Conclusion to Chapter 4 —   | <b>66</b> |
|          | References —  | <b>67</b> |
| <b>5</b> | <b>Presence and Hyperpresence: Implications for Community Awareness</b> |           |
| 5.1      | Introduction to Chapter 5 —   | <b>70</b> |
| 5.2      | Hyperpresence in Local Communities —                                    | <b>71</b> |
| 5.3      | Hyperpresence in Mobile Technologies —                                  | <b>74</b> |
| 5.4      | Hyperpresence in Online Virtual Communities —                           | <b>77</b> |
| 5.5      | Conclusion to Chapter 5 —   | <b>80</b> |
|          | References —  | <b>81</b> |
| <b>6</b> | <b>Measuring Social Presence in Team-Based Digital Games</b>            |           |
| 6.1      | Introduction to Chapter 6 —   | <b>83</b> |
| 6.1.1    | Measuring Social Presence —   | <b>84</b> |
| 6.2      | Overview of the Questionnaire Development —                             | <b>87</b> |
| 6.2.1    | Statistical Criteria —  | <b>89</b> |
| 6.2.2    | Data —  | <b>89</b> |
| 6.3      | Trial 1: Chivalry —   | <b>90</b> |
| 6.4      | Trial 2: Natural Selection 2 —  | <b>91</b> |
| 6.5      | PCA —   | <b>92</b> |
| 6.5.1    | Data Gathering —  | <b>93</b> |
| 6.5.2    | Analysis —  | <b>93</b> |
| 6.6      | Conclusion to Chapter 6 —   | <b>96</b> |
|          | References —  | <b>96</b> |
|          | Appendix —  | <b>99</b> |

|          |  |
|----------|--|
| <b>7</b> | <b>Recreating Leisure: How Immersive Environments Can Promote Wellbeing</b>                              |
| 7.1      | Introduction to Chapter 7 — <b>102</b>   |
| 7.2      | Innovative Research and Industry Applications — <b>104</b>   |
| 7.2.1    | Related Research Projects at Other Centres — <b>105</b>  |
| 7.2.2    | Related Gaming Applications — <b>106</b>   |
| 7.3      | Clinical Background — <b>106</b>   |
| 7.3.1    | About Technology-enhanced Multimodal Meditation (TEMM) and Light and Sound Meditation (LSM) — <b>106</b> |
| 7.4      | TEMM Clinical Study — <b>108</b>   |
| 7.4.1    | Study Design — <b>109</b>  |
| 7.4.2    | Findings: Data Analysis and Results — <b>111</b>   |
| 7.4.3    | Qualitative Subject Feedback — <b>112</b>  |
| 7.5      | Discussion — <b>112</b>  |
| 7.5.1    | Clinical Study Review: Key Insights — <b>112</b>   |
| 7.5.2    | Neurophysiology and Neurochemical Aspects to Consider — <b>113</b>                                       |
| 7.5.3    | Physiological Findings and Clinical Outcomes — <b>115</b>  |
| 7.5.4    | Socioeconomic and Societal Benefits — <b>115</b>   |
| 7.5.5    | Holistic Aspects of TEMM Therapy — <b>116</b>  |
| 7.5.6    | Personalized Medicine Aspects to TEMM and Immersive Wellbeing Environments — <b>117</b>                  |
| 7.6      | Conclusion to Chapter 7 — <b>119</b>   |
|          | References — <b>120</b>  |
| <br>     |  |
| <b>8</b> | <b>Therapeutic Presence in Mediated Psychotherapy: the Uncanny Stranger in the Room</b>                  |
| 8.1      | Introduction to Chapter 8 — <b>123</b>   |
| 8.2      | Therapeutic Presence — <b>126</b>  |
| 8.3      | Mediated Therapeutic Presence — <b>129</b>   |
| 8.4      | Conclusion to Chapter 8 — <b>133</b>   |
|          | References — <b>135</b>  |
| <br>     |  |
| <b>9</b> | <b>Coping with Stress and Anxiety: the Role of Presence in Technology Mediated Environments</b>          |
| 9.1      | Introduction to Chapter 9 — <b>139</b>   |
| 9.2      | Presence as a Link Among Different Approaches — <b>141</b>   |
| 9.3      | From the Ubiquitous to the Interreality Approach — <b>142</b>  |
| 9.4      | Advances in Presence Measurement — <b>144</b>  |
| 9.5      | Conclusion to Chapter 9 — <b>146</b>   |
|          | References — <b>148</b>  |

**10 Does Gender Matter? Exploring Experiences of Physical and Social Presence in Men and Women**

- 10.1 Introduction to Chapter 10 — **152**
- 10.1.1 Sex or Gender? — **153**
- 10.1.2 Presence Equals Presence? — **153**
- 10.2 Physical Presence — **154**
- 10.2.1 Background — **154**
- 10.2.2 Physical Presence in a Stressful vs. a Non-stressful VE — **156**
- 10.2.3 Discussion — **156**
- 10.3 Social Presence — **158**
- 10.3.1 Background — **158**
- 10.3.2 Social Presence in a Collaborative VE — **159**
- 10.3.3 Discussion — **159**
- 10.4 Conclusion to Chapter 10 — **160**
- References — **161**

**11 The Experience of Presence in Persuasive Virtual Environments**

- 11.1 Introduction to Chapter 11 — **164**
- 11.2 Defining Presence in the Context of Persuasion — **165**
- 11.3 Theoretical Frameworks for Examining Presence in Persuasive Environments — **167**
- 11.3.1 Media Richness — **167**
- 11.3.2 Computers as Social Actors — **168**
- 11.3.3 Model of Social Influence in Virtual Environments — **168**
- 11.4 Contexts for Virtual Persuasion — **169**
- 11.4.1 Health — **169**
- 11.4.2 Advertising and E-commerce — **170**
- 11.4.3 Education — **171**
- 11.4.4 Organizations and Work Collaboration — **171**
- 11.5 Implications for Design — **171**
- 11.6 Conclusion to Chapter 11 — **173**
- References — **173**

**Bios — 179**

**Index — 186**