MEC Spatial Presence Questionnaire (MEC-SPQ)

Short Documentation and Instructions for Application

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1   Scale development

Beyond conceptual problems and issues of theoretical integration, the contemporary debate on Spatial Presence research is focused on measurement. Different approaches to operationalize the experience of Spatial Presence have been introduced, most of them questionnaires (e.g., Witmer and Singer, 1998; Lessiter, Freeman, Keogh & Davidoff, 2001). However, most of the available instruments lack a sufficient theoretical foundation. Therefore, one important goal of "Presence: MEC" is the development of a new Spatial Presence questionnaire derived from a solid theory of Spatial Presence.

In January and February 2004, an English version of MEC-SPQ was administered to N = 290 subjects at University of Southern California, Los Angeles, and at international schools in Helsinki and Porto. The participants' mean age was 21.4 years (SD=5.2), ranging from 15 to 54 years (both the youngest and oldest student in Porto. Almost three-fourths of participants were female (n=212, 73.6%). The initial item pool included 103 items that represented nine constructs of the MEC Two-Level Model of Spatial Presence (Vorderer et al., 2003; see figure on next page), including process factors (Attention Allocation, Spatial Siuation Model, Spatial Presence: Self Location, Spatial Presence: Possible Actions), variables referring to states and actions (Higher Cognitive Involvement, Suspension of Disbelief), and variables addressing enduring personality factors (i.e. the trait-like constructs Domain Specific Interest, Visual Spatial Imagery, and Absorption[1]).

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[1] The Absorption scale was created as a modified short version of an existing instrument by Tellegen and Atkinson (1974; see also Tellegen, 1992).

Spatial Presence

Self-Location Possible Actions

Suspension of Disbelief

Cognitive Involvement

Absorption

Spatial Situation Model

Visual Spatial Imagery

Attention Allocation

Domain-Specific Interest
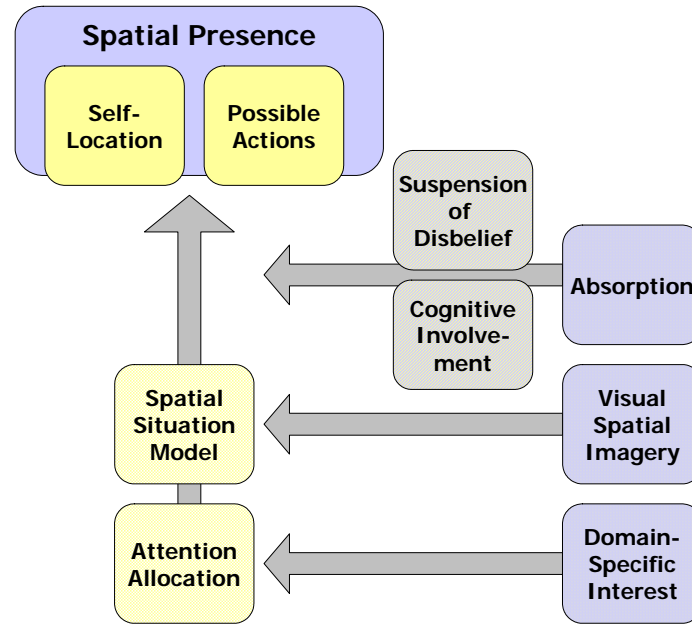
The MEC-SPQ was tested with four types of media (text and film in Los Angeles, hypertext in Helsinki and a virtual environment in Porto)[2]. At each location, a dual-task paradigm was implemented to validate the sensitivity of the scales which target process factors. Half of the participants were distracted several times during media usage and had to perform a secondary task, the other participants were not distracted.

Item analysis and validation

Item analysis following statistical and conceptual considerations was conducted in order to create a final version of MEC-SPQ, which is applicable in further MEC studies and general Presence reseach and consists of valid and reliable scales for each construct. The data allowed creating highly consistent and homogeneous scale versions for all constructs with eight, six or even four items per scale. Full, medium and short versions of all scales (with 8, 6 or 4 items per scale) were computed as arithmetic mean of each scale's items, allowing only one missing value per scale.

All non-trait scales were sensitive for the experimental manipulation of attention (dual-task-procedure) and different types of media, and inter-scale-correlations reflected theoretical assumptions of the MEC two-level model of Spatial Presence (see Vorderer et al., 2004, for more details on item analysis and validation).

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[2] Text: extract of Ken Follett's book "The Pillars of the Earth"; Hypertext: "The Art of Singing", a CD-ROM based multimedia stimulus; Film: sequence from the German war movie "Das Boot – Director's Cut"; VR: Participants navigated through a museum that was inspired by the Musée d'Orsy in Paris, an exhibition of art of the 19th century.

Important notes and instructions for future usage of the MEC-SPQ

All items and instructions were translated into German, Portuguese and Finnish by professional translators. The final questionnaire will be used in upcoming MEC research, allowing replication of the reported results with different media settings and modifying single items or scales, if necessary.

The MEC-SPQ was designed for immediate assignment after media exposure. Starting with instructions how to fill in the questionnaire, and assuring anonymity, all process and state variables (attention, involvement, SoD, SSM, Spatial Presence) should be presented in randomized order. Because of the items' wording, the Domain Specific Interest Scale has to be implemented as a single block. Mixing these items with other scales would overstrain participants' ability to deal with different levels of judgment. Subsequently, all other trait variables have to be assessed as randomized item battery. Finally, sociodemographics and other variables of interest conclude the MEC-SPQ.

2   Scale and item properties

In the following section, main statistical properties of all scales and their respective items are reported.

General remarks:

- The placeholder [medium] has to be replaced by the appropriate type of medium: [e.g., text//film/website/virtual environment]
- For all items, a 5-point Likert scale ranging from 1 ('I do not agree at all') to 5 ('I fully agree') was used
- Items for "suspension of disbelief" marked with (R) have been reverse scored
- Item-remainder coefficients, alpha if item deleted and item homogeneity coefficients correspond to the scales' 8-item versions.

Abbrevations

n	*Number of respondents*
M	*Arithmetic mean*
SD	*Standard deviation*
p	*Item difficulty [=(M-1)/4)]*
r_{it}	*Corrected item-scale correlation (item-remainder coefficient)*
α	*Cronbach's Alpha if item deleted*
M_r	*Item homogeneity (average inter-item correlation)*

2.1 Attention Allocation

Attention Allocation	n	min	max	M	SD	Skew-ness	Kur-tosis	Cron-bachs alpha
8-item scale	290	1.0	5.0	3.45	.94	-.46	-.65	.93
6-item scale	290	1.0	5.0	3.37	.97	-.41	-.74	.91
4-item scale	290	1.0	5.0	3.35	1.04	-.38	-.74	.90

8-item scale / 6-item scale / 4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X X X	I devoted my whole attention to the [medium].	290	3.35	1.27	.588	.832	.920	.681
X X X	I concentrated on the [medium].	290	3.62	1.08	.654	.826	.921	.675
X X	My attention was claimed by the [medium].	289	3.43	1.16	.606	.778	.924	.639
X	I directed my attention to the [medium].	290	3.86	1.05	.716	.776	.924	.643
X X X	The [medium] captured my senses.	290	3.18	1.16	.544	.653	.933	.531
X X X	I dedicated myself completely to the [medium].	290	3.27	1.24	.568	.858	.917	.700
X	My attention was caught by the [medium].	277	3.52	1.11	.630	.772	.924	.642
X X	My perception focused on the [medium] almost automatically.	289	3.39	1.10	.598	.654	.932	.550

2.2   Spatial Situation model (SSM)

SSM	N	min	max	M	SD	Skew-ness	Kur-tosis	Cron-bachs alpha
8-item scale	290	1.1	5.0	2.88	.88	.19	-.61	.90
6-item scale	290	1.0	5.0	2.92	.89	.12	-.65	.87
4-item scale	290	1.0	5.0	2.92	.97	.08	-.73	.86

8-item scale 6-item scale 4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X X X	I was able to imagine the arrangement of the spaces presented in the [medium] very well.	289	2.89	1.09	.471	.737	.883	.564
X X X	I had a precise idea of the spatial surroundings presented in the [medium].	290	3.20	.99	.551	.490	.904	.393
X	In my mind's eye, I was able to clearly see the arrangement of the objects presented/described.	290	2.89	1.12	.472	.698	.887	.538
X X X	I was able to make a good estimate of the size of the presented space.	290	2.97	1.15	.493	.745	.882	.569
X X	I was able to make a good estimate of how far apart things were from each other.	290	2.97	1.15	.493	.621	.894	.486
X X X	Even now, I still have a concrete mental image of the spatial environment.	289	2.87	1.21	.468	.787	.878	.593
X	Even now, I could still draw a plan of the spatial environment in the presentation.	290	2.61	1.13	.403	.678	.889	.517
X X	Even now, I could still find my way around the spatial environment in the presentation.	290	2.61	1.25	.403	.733	.884	.560

2.3 Spatial Presence

a) Spatial Presence: Self Location (SPSL)

SPSL	n	min	max	M	SD	Skewness	Kurtosis	Cronbachs alpha
8-item scale	290	1.0	5.0	2.38	.91	.50	-.36	.93
6-item scale	290	1.0	5.0	2.37	.94	.52	-.36	.92
4-item scale	290	1.0	5.0	2.33	.99	.56	-.42	.92

8-item scale / 6-item scale / 4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X	I had the feeling that I was in the middle of the action rather than merely observing.	290	2.21	1.11	.302	.655	.931	.558
X X	I felt like I was a part of the environment in the presentation.	288	2.17	1.07	.293	.805	.920	.663
X X X	I felt like I was actually there in the environment of the presentation.	288	2.56	1.15	.391	.853	.916	.699
X X	I felt like the objects in the presentation surrounded me.	290	2.72	1.17	.429	.612	.935	.521
X X X	It was as though my true location had shifted into the environment in the presentation.	290	2.32	1.11	.331	.806	.920	.668
X	It seemed as though my self was present in the environment of the presentation.	290	2.64	1.11	.409	.773	.923	.641
X X X	I felt as though I was physically present in the environment of the presentation.	290	2.09	1.07	.272	.801	.921	.664
X X X	It seemed as though I actually took part in the action of the presentation.	289	2.33	1.08	.333	.824	.919	.679

b) Spatial Presence: Possible Actions (SPPA)

SPPA	n	min	max	M	SD	Skew-ness	Kur-tosis	Cron-bachs alpha
8-item scale	289	1.0	4.4	2.32	.81	.38	-.54	.88
6-item scale	289	1.0	4.5	2.29	.84	.36	-.58	.86
4-item scale	290	1.0	4.8	2.32	.88	.36	-.63	.81

8-item scale / 6-item scale / 4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X	I felt like I could jump into the action.	290	2.40	1.12	.350	.579	.874	.433
X X	I had the impression that I could act in the environment of the presentation.	290	2.36	1.10	.340	.768	.854	.558
X X X	I had the impression that I could be active in the environment of the presentation.	290	2.43	1.11	.358	.787	.852	.573
X X X	I felt like I could move around among the objects in the presentation.	290	2.44	1.11	.359	.650	.866	.483
X X X	The objects in the presentation gave me the feeling that I could do things with them.	290	2.23	1.08	.309	.788	.852	.573
X	I had the impression that I could reach for the objects in the presentation.	289	2.40	1.15	.351	.645	.867	.479
X X	It seemed to me that I could have some effect on things in the presentation, as I do in real life.	289	2.12	1.04	.280	.486	.882	.373
X X X	It seemed to me that I could do whatever I wanted in the environment of the presentation.	289	2.16	1.11	.291	.482	.883	.369

2.4   Higher Cognitive Involvement

Involvement	n	min	max	M	SD	Skew-ness	Kur-tosis	Cron-bachs alpha
8-item scale	290	1.0	4.8	2.85	.76	.03	-.51	.78
6-item scale	290	1.0	4.8	2.96	.80	-.03	-.53	.74
4-item scale	290	1.0	5.0	2.98	.85	.00	-.61	.66

8-item scale / 6-item scale / 4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X X X	I thought most about things having to do with the [medium].	290	3.17	1.13	.543	.435	.768	.283
X	I imagined precisely what it must be like to further explore the world presented in the text/website/Film/virtual environment).	289	2.96	1.22	.490	.430	.769	.279
X	I kept wondering whether the presentation in the [medium] could have personal meaning for me.	290	2.04	1.17	.260	.483	.760	.303
X X	I thought intensely about the meaning of the [medium] presentation.	290	2.82	1.21	.454	.501	.757	.319
X X X	I thoroughly considered what the things in the presentation had to do with one another.	290	2.82	1.21	.455	.472	.762	.303
X X X	The [medium] presentation activated my thinking.	290	3.38	1.15	.595	.537	.752	.340
X X X	I thought about whether the [medium] presentation could be of use to me.	290	2.56	1.36	.391	.547	.749	.344
X X	I thought about just how much I know about the things in the presentation.	290	3.01	1.20	.503	.491	.759	.313

2.5   Suspension of Disbelief (SoD)

SoD	n	min	max	M	SD	Skew-ness	Kur-tosis	Cron-bachs alpha
8-item scale	289	1.3	4.9	3.24	.85	-.09	-.83	.83
6-item scale	290	1.2	5.0	3.23	.98	-.11	-.90	.86
4-item scale	290	1.0	5.0	3.17	1.02	-.07	-.89	.80

8-item scale / 6-item scale / 4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X X X	(R) I concentrated on whether there were any inconsistencies in the [medium].	288	3.54	1.24	.635	.758	.787	.416
X X X	I didn't really pay attention to the existence of errors or inconsistencies in the [medium].	290	3.13	1.39	.532	.716	.791	.377
X X	(R) I directed my attention to possible errors or contradictions in the [medium].	290	3.13	1.34	.534	.716	.791	.381
X	(R) I thought about whether the action or the [medium] presentation was plausible.	288	3.09	1.17	.523	.465	.825	.282
X	(R) I wondered whether the [medium] presentation could really exist like this.	290	3.43	1.22	.609	.190	.858	.120
X X X	(R) I took a critical viewpoint of the [medium] presentation.	290	3.09	1.21	.523	.408	.832	.232
X X	(R) It was important for me to check whether inconsistencies were present in the [medium].	290	3.56	1.11	.640	.633	.806	.352
X X X	It was not important for me whether the [medium] contained errors or contradictions.	290	2.94	1.34	.486	.624	.805	.360

2.6   Domain Specific Interest (DSI)

DSI	N	min	max	M	SD	Skew-ness	Kur-tosis	Cron-bachs alpha
8-item scale	289	1.0	4.9	2.32	.97	.75	-.10	.93
6-item scale	289	1.0	5.0	2.42	.99	.67	-.19	.92
4-item scale	289	1.0	5.0	2.39	1.01	.67	-.20	.88

8-item scale	6-item scale	4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X	X	X	I am generally interested in the topic of the [medium].	290	3.08	1.28	.521	.686	.929	.574
X	X		The [medium] corresponded very well with what I normally prefer.	289	2.43	1.09	.358	.714	.926	.595
X	X	X	I have felt a strong affinity to the theme of the [medium] for a long time.	289	2.24	1.11	.311	.810	.919	.667
X	X	X	There was already a fondness in me for the topic of the [medium] before I was exposed to it.	289	2.34	1.24	.336	.813	.918	.667
X			Whenever I had a choice, I would decide to deal with the topic of the [medium].	289	2.21	1.19	.302	.738	.924	.613
X	X		Things like the ones in the [medium] have often attracted my attention in the past.	289	2.49	1.29	.374	.814	.918	.668
X	X	X	I just love to think about the topic of the [medium].	289	1.91	1.08	.228	.797	.920	.657
X			In the past, I have spent a lot of time dealing with the topic of the [medium].	289	1.85	1.11	.213	.740	.924	.616

2.7 Visual Spatial Imagery (VSI)

VSI	n	min	max	M	SD	Skew-ness	Cur-tosis	Cron-bachs alpha
8-item scale	289	1.5	5.0	3.56	.70	-.22	-.34	.82
6-item scale	289	1.5	5.0	3.46	.73	-.18	-.48	.80
4-item scale	289	1.5	5.0	3.43	.78	-.20	-.52	.77

8-item scale 6-item scale 4-item scale	Item	n	M	SD	p	r_{it}	α	M_r
X X X	When someone shows me a blueprint, I am able to imagine the space easily.	289	2.99	1.06	.498	.533	.533	.800
X X X	It's easy for me to negotiate a space in my mind without actually being there.	289	3.62	1.02	.655	.578	.607	.794
X	When I read, I often have a precisely detailed image of the described surroundings in my mind's eye.	287	3.87	.98	.718	.503	.558	.804
X X X	When I read a text, I can usually easily imagine the arrangement of the objects described.	289	3.56	.98	.639	.600	.625	.791
X X	When someone gives me directions to a place, I can picture the route as though I were watching a film.	289	3.19	1.31	.547	.453	.454	.817
X X X	When someone describes a space to me, it's usually very easy for me to imagine it clearly.	288	3.54	.99	.635	.705	.732	.777
X	I can vividly imagine how small I would seem at the foot of a high mountain.	286	3.82	1.15	.705	.436	.478	.815
X X	When a picture shows only part of a space, I can clearly imagine the rest of the space.	287	3.40	.91	.599	.583	.595	.795

3   References

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