PhD Pilot Project #2: PPI Questionnaire on Adaptive Wearable Appropriateness as an Autistic Intervention

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Abstract

Autism Spectrum Condition (ASC) is a life-long diagnosis, which has a subset of features including hyper-, seeking- and/or hypo-reactivity to sensory inputs or unusual interests (APA, 2013). These qualities are evident across *environmental* (e.g. response to specific sounds, visual fascination with lights or movements) and *physiological domains* (e.g. anxiety, respiration or euthermia). Scholars report that ninety (90%) of autistic adults experience sensory issues causing significant barriers at school/work (Leekam et al., 2007). As part of a larger PhD Research Project, this pilot study establishes designs, processes and measures that may establish if autistic individuals find value utilising adaptive/wearable interventions that possibly alter, redirect and/or attenuate disruptive stimuli. This study incorporates benign information not yet containing practical data, other than to provision and trial space where real data is nominally present. This pilot loads systems functionality for future use (e.g. consent, demographic collection, measures, post-mortem/survey feedback, storage, sorting, query, statistical analyses and reporting). Finally, this pilot provisions a follow-on and full-fledge Participant Public Involvement (PPI) designed to exploit data from focus group and co-produced surveys/designs. In turn, these may be used to inform an as-yet-to-be developed interventional prototype. Hence, the forthcoming PPI—by leveraging this pilot—aims to describe what degree sensory distractions occur among adolescent and adult ASC participants. Both pilot and PPI aspire to whether focus, anxiety and attentional concerns are perceived as negative issues and if individuals prefer assistance (vis à vis assistive wearables) to reduce anxiety, distractions and increase focus at school and at work (Bagley et al., 2016). This study results yield promise; in that, a subsequent PPI can be leveraged to obtain co-designed autistic data leading to a randomised clinical trial.

Keywords: Autism Spectrum Condition, Attention, Focus, Restricted, Repetitive Patterns of Behaviour and Interests, Distractibility, Anxiety, Participant Public Involvement, Co-design, Adaptive Wearable

1. Introduction

Individuals with Autism Spectrum Condition (ASC) often exhibit persistent deficits in social communication and interaction across multiple contexts (APA, 2013). An additional hallmark, which forms the focus of this study, includes restricted, repetitive patterns of behavior and interests (RRBI). Importantly, RRBIs include hyper-, seeking- and/or hypo-reactivity to sensory input along with attainably unusual interests in sensory aspects of the environment and physiological responses to visuals, textures, smells, touch and sounds.

In order to better understand and potentially comfort those living with sensory issues, the study aspires to an imminent Participant Public Involvement (PPI) study designed to inform a larger PhD project by making targeted and relevant designs for an as-yet-to-be developed interventional prototype. Through participant-friendly, ethically sound and inclusive

research (e.g. focus groups and questionnaires), the study and PPI aim to provision and describe what degree and difficulty ecological, sensory and anxieties present among ASC constituents.

Secondarily, the both pilot and PPI aspires to determine whether distractions exist and are exacerbated at school and at work. Fundamentally, both works intend on determining whether focus, anxiety and attentional concerns are perceived as *negative issues* and whether or not autistic individuals *prefer assistance* (vis à vis assistive technologies) to mitigate distractions and increase focus (Bagley et al., 2016).

1.1 A Principled Commitment

The pilot and PPI are viewed as moral obligations—those enabling and ensuring that subsequent prototype designs and follow-on clinical trials address the exacting needs of ASC individuals (Russell et al., 2018). These study outcomes—importantly—seek to provide foundational support by confirming follow-on systems and research validity and reliability.

Scholars corroborate that addressing sensory issues through qualitative/quantitative study of individuals with autism facilitates a greater understanding of how interventions can assuage ecological distractions, attentional dilemmas and accompanying anxieties (South & Rodgers, 2017; Rodgers et al., 2016; Rodgers & Odfield, 2018). Further, and as cognitive, attentional and sensory knowledge deepens within autism research, concentrated and robust treatment becomes justified (Top Jr. et al., 2019).

While considerable autism research details high-tech device efficacy among behavioural, communication and socio-emotional skills development (Eliçin & Kaya, 2016), there is a paucity of literature describing technologies targeting attention, distraction and multi-sensitivity, sensory and other ecological/cognate concerns. The research becomes further infrequent in themes relating to RRBI and assistive technologies at school and in the workplace.

Therefore, this study and PPI purposefully circumvent those DSM-5 matters that have been extensively considered elsewhere. Those matters relate to numerous social, behavioural and communication interventions aimed to *'correct'* individual deficits. Hence, there is nothing remedial regarding this pilot or subsequently PPI, which seeks to examine designs, applications and resulting potentials of a wearable as a '*cognitive and quality-of-life enhancement'*.

1.2 Broader Methodological Approach

PPI procedural strategy leverages user-centred and co-produced questions and data. In this particular study, and due to ASC's heterogeneity, all surveys, questionnaires emanate from future focus group input delineating environmental, physiological, sensory and attentional issues likely to affect a broad range of individuals, their comfort and their well-being. For the purposes of testing this pilot, guidance questionnaires and benign data is collected, analysed and reported.

In the coming months, additional questions supplementing this pilot are scheduled. Additionally, the benign data points presented herein will be replaced with co-produced surveys and data provided by a larger pool of participants who may disclose their opinions, attitudes and interests.

For now, this pilot—including its design, implementation, testing and data analyses—forms the majority of this paper and is intended to form the foundation of PPI systems for future use (e.g. participant consent, demographic collection, participant measures, and post-mortem/survey feedback).

1.3 PPI and Neurodiversity

The essence of neurodiversity informs us that "in identifying such areas for support and measuring suitable outcomes, our goal should be to provide relief in areas of need but not to eliminate an individual's neurodivergent status" (Fletcher-Watson & Happé, 2019, p. 23). Such is the rationale for employing PPI: unrestrained scrutiny of the autistic community's lived experience of sensory volatilities and related anxieties is paramount. By employing participatory design, subsequent questionnaire and detailed analyses, the following objectives may be obtained; specifically: (1) methodically understanding and confirming the autistic community's desire to lessen ecological and physiological anxieties and consequent distractions; and, (2) informing the design of prototype to (a) lessen environmental stimuli, biological anxiety and resultant disturbances; while (b) simultaneously increasing attentional focus, sensory processing and quality of life.

1.4 Theory

Load Theory (LT) can be utilised for making predictions about future responses and potential behaviours. Further, *Dilution Theory* competes with LT by suggesting that reductions in distractor interference observed under high perceptual load occur through a weakening effect from neutral items (Tillmann et al., 2015). This study may create data supporting designs that dilute or eliminate stimuli—for example, distracting sounds or visual—by generating neutralizing waveforms or alerts of potentially distressing impulses.

Bayesian Theory (BT) may assist linking nonconforming sensory perception with neurotypical responses. Because Bayesian networks can facilitate

modelling of complex dependencies (Porayska-Pomsta, 2004), both pilot and PPI may leverage data pinpointing efficiencies and computational perspectives of sensory predictions and targeted treatments. Ultimately, BT may provide predictive and alerting systems for a prototype.

Local Processing Bias (e.g., LPB including *Enhanced Perceptual Function* and *Weak Central Coherence* theories) contend that autistic differences result from bottom-up versus top-down processing, respectively (Happé, 1999). This pilot and PPI aim to leverage data defining global processing and/or related impairment rationale. In so doing, LPB data may present as deficit-prone, not widely supported, categorically misunderstood and deserving of greater elucidation.

Finally, *Reverse-Hierarchy Theory* provides an alternative lens to sensory sensitivities, suggesting a gist-level tolerance to cues and delayed awareness to local-level details. Ahissar & Hochstein (2004) point out that sensory perception is dominated within an initial timeframe followed by emergent details that trail attentional onset. The PPI may confirm data supporting these considerations—leveraging reversal reports to effectively intervene, aid and include those that otherwise do not fit squarely within other frameworks.

1.5 Project Aspirations, Research Questions, Testable Predictions and Hypothesis

Ours is a world where distractions, anxiety and stimulating environments are the norm; hence, this study **aspires** to:

- Explore the phenomenon, importance and interest of autistic individuals to decrease their distractibility/anxiety, increase their focus and improve their quality of life.
- Obtain first-person data and a deeper understanding of attentional difficulties related to autistic sensory issues and attentional concerns.
- Measure the importance, potential and on-going utilization of assistive technologies.

This study includes 3 inter-related **research questions**:

- Q1.: What is the first-person, lived experience of autistic individuals concerning attentional and sensory issues (e.g. distraction, focus and anxiety) stemming from ecological and physiological cues and occurring within school and work settings?
- Q2.: To what extent might attentional, anxiety and sensory technologies be tolerated by autistic individuals and would they be agreeable to interacting with wearable devices on a daily basis?
- Q3.: How can cognitively enhancing technologies be designed, adapted and evaluated to produce acceptable, accessible and flexible supports and outcomes that are responsive to autistic individuals' unique attentional and sensory needs?

Testable predictions suggest: (i) participants may rank high their perception/use of wearable technologies that reduce anxieties, environmental, physiological and/or sensory distractions; (ii) participants may rank high opinions that increase their attentional and/or focusing concerns; and (iii) a new body of knowledge, including data describing strengths, weaknesses, opportunities and threats (e.g. SWOT Analysis) may also emerge—highlighting where ecological and physiological improvements may be necessary.

The Pilot Study's **hypotheses** (H1 & H2) are:

H1. Sufficient environmental and physiological sensory challenges and related attentional, distractibility and anxiety data can be harvested, stored, sorted, queried and analysed sufficient to represent the lived experiences of autistic individuals in both school and work contexts; and,

H2. The study can serve as the basis for the participatory co-design, production, deployment and implementation of a follow-on PPI and prototype to be used in a randomised clinical trial.

The rest of this paper is organized as follows: Section 2 is devoted to a review of participant recruitment, data collection, storage and security, methodology, outcome measures, sampling strategy, experiment design, benign testing data and statistical analyses. Section 3 provides sample empirical data across a variety of queries and output reporting structures.

In Section 4 a discussion of results of the overarching PhD effort is explored along with this study's limitations. Section 5 concludes the paper by summarizing pilot study achievements.

2. Methods

This pilot (and initial testing effort of software and hardware systems) was created during and following the 4-week period straddling the 2019-2020 Winter academic break and by the PhD student.

2.1 Participants and Recruitment

Pilot participants included verbally able, autistic and neurotypical adolescents and adults (age 15-84). All participants were required to complete consent forms prior to testing and were recruited through the researcher's public website and email invitation. All participants have intelligence in the normal or above average range and the majority are living independent lives. This means that these participants did not fall into the general learning disabilities range.

As previously advised by the UCL Ethics Committee and Institute of Cognitive Neuroscience, autistic adults

are not considered vulnerable resulting from their own written consent to participate. Where appropriate, parents and guardians provided written consent for minors 18 years of age and younger.

2.2 Data Collection, Storage and Security

Participants provided health/medical conditions and disability information relevant to their opinions about distractibility, focus and anxiety at both school and work. Participants were explicitly asked to volunteer this information, which is stored separately from personal identifiable information and linked only by an identifying code.

Personal data, including name, date of birth, email, telephone and address was collected to communicate future participation and research opportunities. All personal data is pseudonymised (e.g. again, key-coded) to protect against any potential or indirect identification in combination, whole and/or part with underlying data.

Personal identifiable data in electronic form is stored on encrypted USB sticks, hard drives and/or kept in a locked filing cabinet in locked offices at the Culture, Communication and Media (CCM) department. Personal data in paper form (e.g. consent forms) are scanned and stored electronically prior to being shredded. Archived paperwork is stored in locked filing cabinets in locked offices at the CCM. Any other data is archived, backed and/or stored on secure UCL servers.

2.3 Methodology

Before the study, participants provided informed consent along with a verifiable ASC diagnosis, where applicable. All participants were invited to take part in one or both of the forthcoming opportunities:

- A **Focus Group** (N=12) exploring distractibility and attentional focus. The main task is to comment on sensory issues and input into the design of a user survey to ensure relevance to autism and adherence to an autism-friendly format.
- **User Survey** (N = 150 individuals) providing first-person perspectives on distractibility and focus while gathering views and opinions of which aspects of technological aid/support would be most welcomed and have the biggest impact on sensory, attentional and quality of life issues.

This study's participants (N=16) participated in a mock-up/pilot of the User Survey above.

2.4 Measures of Distractibility and Focus

Embedded within this study is a Customized Open-Ended Questionnaire Pilot (CO-EQ) developed for participant expression and used as a preparatory point to discuss focus, distractibility, anxiety, sensory and attentional difficulties and needs. This CO-EQ was utilised and will be subsequently amended by the aforementioned and follow-on focus group detailing additional topics and scenarios where individuals may welcome assistance that may impact on their well-being and performance. CO-EQ participants were encouraged to specify interests, attitudes and opinions about receiving technology supports. This study was dispensed online; and, future online PPI versions may also be provided in writing, telephone and/or in person.

Table 1: Experimental Materials

Hardware	
Computer Laptop (authoring, programming and analyses)	Apple MacBook Air 11-inch, Mid 2012. Processor @ 1.7 GHz Intel Core i5 Processor. Memory @ 4 GB 1600 MHz DDR3. Graphics @ Intel HD Graphics 4000 1536 MB.
Software	
Gorilla Experiment Builder (Environment Version 2019126 @ www.gorilla.sc)	• Design, program, serve and collect data. • Cloud-based platform is specific to the behavioural sciences. • Microsoft Azure hosting residing in the EU/Republic of Ireland. • All traffic is TLS/SSL encrypted. • Database is encrypted using industry-standard cryptography. • The author/researcher owns and maintains all collected data. • Fully data protection compliant including BPS and GDPR.
Microsoft Excel (Version 16.34—Build 20020900)	Data collection, sorting and reporting.
IBM SPSS (Release 26)	Data collection, sorting analyses and reporting.
University College London Servers and Researcher's Secured, Encrypted and Private Computer	• All data stored here • Fully compliant with UCL ethics and data protection policies (e.g. UCL Data Protection Registration Number 17345/001 issued 13 December 2019).

2.5 Outcomes

The pilot and PPI study have three measurable outcomes (O1.—O3.):

O1.: An appreciation of attentional difficulties and how this affects autistic individual's well-being from an experiential, first-person perspective;

O2.: A detailed survey of modalities, distractors, sensory, and anxiety issues affecting participant experiences at school and work in order to develop theoretical/computational models; and,

O3.: The designs necessary to develop assistive technologies that may enhance autistic individuals' daily functioning, self-efficacy and well-being.

In contrast to typical top-down, correctional interventions that focus on deficits, the research outcomes relate to understanding the diversity of experiences while determining how to adjust environments through technology (e.g., "muting" some distractors, coaching others, etc.) and fostering the autonomy of affected individuals.

All CO-EQ Pilot systems and apparatus are described in Table 1. With respect to variable definitions and measurements, this study leverages two independent (IV) and eight dependent variables (DV) outline in Table 2.

Table 2: Independent and Dependent Variable

Variable	Description
IV 1: Consent Data	Consisting of 9 questions establishing willingness and right to participate
IV 2: Demographic Data	Consisting of 11 questions of unique categorical and continuous participant data.
DV 1: Device questions	21 Questions relating to wearable desirability and interest, along with: sound, vision, physiology, distraction, focus, anxiety, and tolerance preferences.
DV 2: Distraction & Focus Data	8 Questions relating to venue, interruption, focus, hyposensitivity and comprehension.
DV 3: Interoceptive Data	12 Questions relating to anxiety, internal regulation and physiological sensitivity.
DV 4: General sensitivity questions	18 questions relating to haptics, wearables, ecological stimulus, touch, lethargy, sound, visual, hypersensitivity, hyposensitivity, physiological, focus, tasks, abandonment and venue.
DV 5: Sound questions	6 questions relating to hypersensitivity and hyposensitivity.
DV 6: Technology questions	4 questions relating to comfort and anxiety.
DV 7: Timing questions	4 questions relating to lifetime experiences and 18 questions relating to prior two weeks' opinions of sensitivity issues, depression, pleasure, sleep, energy, appetite, movement, concentration, interoceptive sense, sensations, anxiety and other issues.
DV 8: Visual questions	10 questions relating to hypersensitivity, hyposensitivity, tracking, discrimination, perception difficulties

2.6 Sampling strategy

Because of doctoral training module time constraints, a *convenience/opportunity sampling strategy* was utilised leveraging participants (N = 16) that were most easily resourced and available. Ordinarily, recruitment of autistic individuals utilizing a *stratified random sampling* strategy would be employed to maintain heterogenous selections.

Statistical data was be based upon randomization and anonymizing participants. Crosstabulation data for diagnosis, age, gender, ethnicity, handedness and education appear in Table 4.

2.7 Experiment Design and Benign Data

As mentioned, this study incorporates benign data designed to reserve space where forthcoming and authentic records are expected. The intention is to properly provision and load pilot questionnaire with live test data for optimisation related to legitimate PPI Study—including the collection of participant consent, demographic data, sensitivity measures and post-mortem/survey feedback.

In this pilot study, all test data collected is used as a placeholder for both assessment and operational purposes, particular with external systems for cloud manipulation and data storage—along with—localized sorting, analyses, query-development and reporting. All data is used as stubs or pads to bolster software analysis, quality control and assurance issues by certifying that all experimental variables and data fields are occupied. Pilot data was rigorously evaluated and documented to ensure that unintended effects are avoided in future deployments.

2.8 Data Collection Procedure

The study's sole PhD student is responsible for recruitment, ethical applications and reinforcement, research, testing administration, experiment design, data collection and statistical analysis.

Participant data and consent forms were obtained along with Study Description Sheets in alignment with UCL Data Protection and Ethics Departments. All GDPR processes and privacy compliancy issues were maintained with consistent data retention plans. Figure 1 represents the data flow and collection procedure design within the Gorilla Environment.

2.9 Statistical analysis

IBM SPSS is used in benign study data analyses. In addition to demographic data (Table 3), a variety of statistical data (Table 4) features:

- **Crosstabulation** of gender, diagnoses and critical demographic variables across all DV and specific modality questions (e.g. interoceptive, aural, visual, sensitivity-type, etc.).

- **Chi-square** analyses include demographics and dependent variables yielding Pearson, Spearman correlation, Likelihood ratios and linear-by-linear associations.
- **Directional measures** include all variables yielding *Lambda* and Goodman and Kruskal *Tau*.

Table 3: SPSS Demographic Data

Frequency Table

Diagnosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prefer not to say	1	6.3	6.3	6.3
	ASD	5	31.3	31.3	37.5
	NT	10	62.5	62.5	100.0
	Total	16	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17 and younger	2	12.5	12.5	12.5
	18–20	1	6.3	6.3	18.8
	21–29	1	6.3	6.3	25.0
	40–49	1	6.3	6.3	31.3
	50–59	8	50.0	50.0	81.3
	60–69	1	6.3	6.3	87.5
	70–79	1	6.3	6.3	93.8
	80 and older	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	7	43.8	43.8	43.8
	Male	8	50.0	50.0	93.8
	Other (please specify)	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Handedness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Left-handed	1	6.3	6.3	6.3
	Right-handed	15	93.8	93.8	100.0
	Total	16	100.0	100.0	

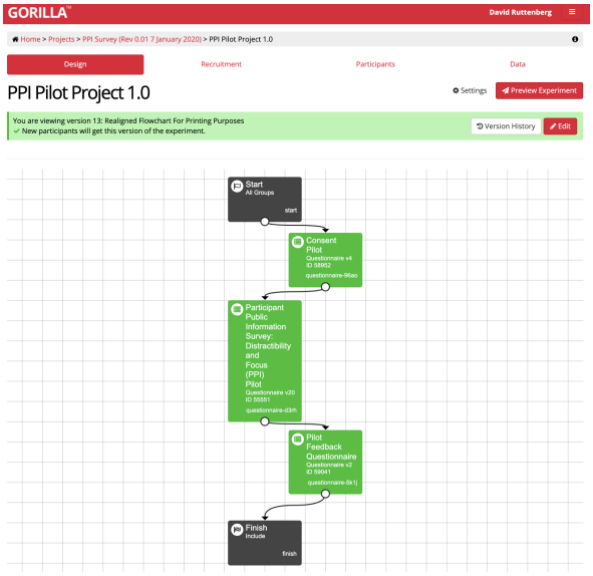
Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduate/Post-graduate degree	7	43.8	43.8	43.8
	Less than high school degree	2	12.5	12.5	56.3
	Some college but no degree	3	18.8	18.8	75.0
	Undergraduate degree	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Employment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Full-time (40 hours or more a week)	8	50.0	50.0	50.0
	Not employed and not looking for work	2	12.5	12.5	62.5
	Not employed but looking for work	2	12.5	12.5	75.0
	Part-time (less than 40 hours a week)	2	12.5	12.5	87.5
	Retired	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Figure 1: Data Flow Diagram



3. Results

Various pilot outcomes using benign data are depicted in Figures 2 and 3. These graphics report *sensitivity across three modalities* (e.g. visual, aural and anxiety) along with *wearable interest* among ASC participants for visually distracting stimuli. Similar outcomes are provisioned for future PPI study,

Figure 2: Combined Sensitivity Across Multiple Modes

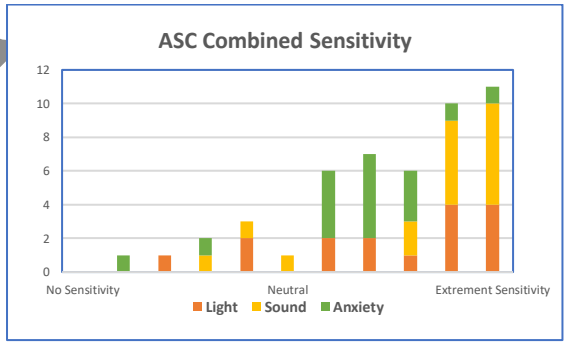
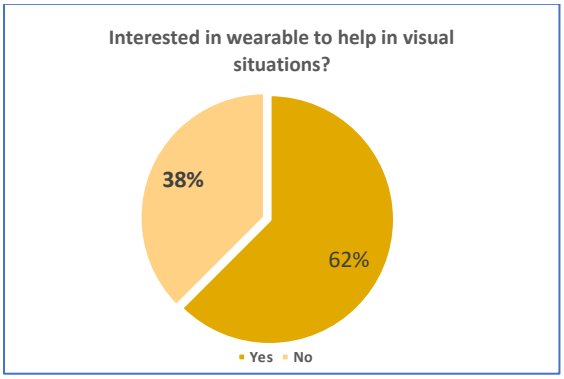


Figure 3: Wearable Interest for Visual Sensitivity



With more than 100 Pilot questions, individual statistics are captured. Depicted below, for example, Q.178, asks participants whether or not they are *"Sensitive to bright lights and might squint, cover eyes and or get headaches"*. Responses are cross tabulated against gender and diagnoses with charts (Figure 5) providing wearable desirability.

Figure 4: Question 178 Statistical Data

Diagnosis * Q178 * Gender

Crosstab

Count

Gender			Q178 0	2	3	4	5	6	7	8	Total
Female	Diagnosis	ASD	1				1	0	0		2
		NT	1				2	1	1		5
	Total		2				3	1	1		7
Male	Diagnosis	Prefer not to say	0	1	0	0				0	1
		ASD	1	0	1	0				1	3
		NT	2	0	0	1				1	4
	Total		3	1	1	1				2	8
Other (please specify)	Diagnosis	NT	1								1
	Total		1								1
Total	Diagnosis	Prefer not to say	0	1	0	0	0	0	0	0	1
		ASD	2	0	1	0	1	0	0	1	5
		NT	4	0	0	1	2	1	1	1	10
	Total		6	1	1	1	3	1	1	2	16

Chi-Square Tests

Gender		Value	df	Asymptotic Significance (2-sided)
Female	Pearson Chi-Square	1.283[b]	3	.733
	Likelihood Ratio	1.784	3	.618
	Linear-by-Linear Association	.788	1	.375
	N of Valid Cases	7		
Male	Pearson Chi-Square	10.556[c]	8	.228
	Likelihood Ratio	8.997	8	.343
	Linear-by-Linear Association	.009	1	.925
	N of Valid Cases	8		
Other (please specify)	Pearson Chi-Square	.[d]		
	N of Valid Cases	1		
Total	Pearson Chi-Square	20.000[a]	14	.130
	Likelihood Ratio	12.347	14	.578
	Linear-by-Linear Association	.181	1	.670
	N of Valid Cases	16		

a. 24 cells (100.0%) have expected count less than 5. The minimum expected count is .06.

b. 8 cells (100.0%) have expected count less than 5. The minimum expected count is .29.

c. 15 cells (100.0%) have expected count less than 5. The minimum expected count is .13.

d. No statistics are computed because Diagnosis and Q178 are constants.

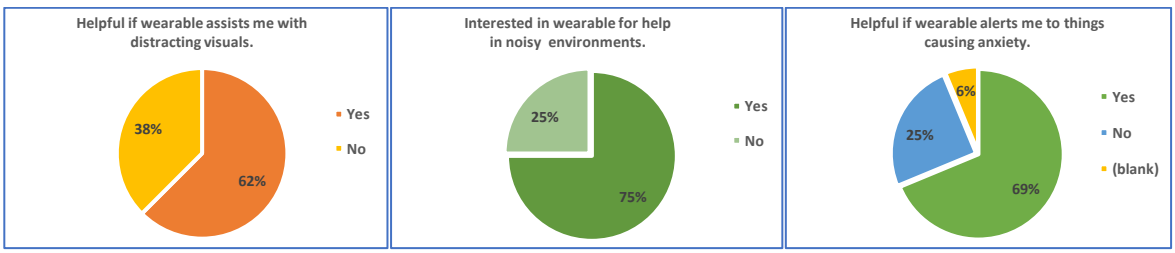
Directional Measures

Gender				Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Female	Nominal by Nominal	Lambda	Symmetric	.000	.408	.000	1.000
			Diagnosis Dependent	.000	.707	.000	1.000
			Q178 Dependent	.000	.354	.000	1.000
		Goodman and Kruskal tau	Diagnosis Dependent	.183	.174		.777[c]
			Q178 Dependent	.053	.061		.813[c]
Male	Nominal by Nominal	Lambda	Symmetric	.333	.222	1.238	.216
			Diagnosis Dependent	.500	.354	1.069	.285
			Q178 Dependent	.200	.179	1.069	.285
		Goodman and Kruskal tau	Diagnosis Dependent	.509	.095		.523[c]
			Q178 Dependent	.250	.061		.537[c]
Other (please specify)	Nominal by Nominal	Lambda	Symmetric	.[d]			
Total	Nominal by Nominal	Lambda	Symmetric	.188	.143	1.182	.237
			Diagnosis Dependent	.333	.272	1.033	.302
			Q178 Dependent	.100	.095	1.033	.302
		Goodman and Kruskal tau	Diagnosis Dependent	.385	.059		.643[c]
			Q178 Dependent	.113	.017		.618[c]

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

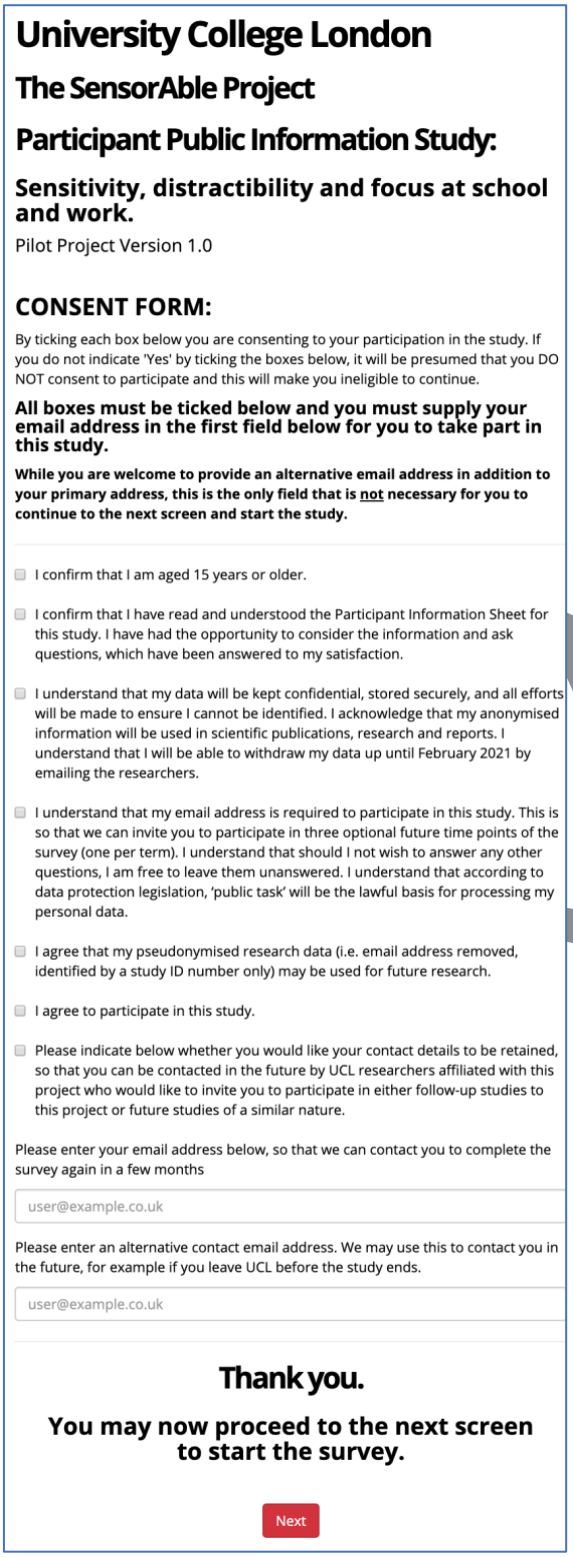
Figure 5: Wearable Desirability as an Assistive Technology



3.1 Consent and Feedback Form Results

Screen captures provide Consent (Figure 6) and Feedback Forms (Figure 7) along with a typical Study Questionnaire screen (Figure 8) appear below.

Figure 6: PPI Pilot Consent Form



University College London

The SensorAble Project

Participant Public Information Study:

Sensitivity, distractibility and focus at school and work.

Pilot Project Version 1.0

CONSENT FORM:

By ticking each box below you are consenting to your participation in the study. If you do not indicate 'Yes' by ticking the boxes below, it will be presumed that you DO NOT consent to participate and this will make you ineligible to continue.

All boxes must be ticked below and you must supply your email address in the first field below for you to take part in this study.

While you are welcome to provide an alternative email address in addition to your primary address, this is the only field that is not necessary for you to continue to the next screen and start the study.

- I confirm that I am aged 15 years or older.
- I confirm that I have read and understood the Participant Information Sheet for this study. I have had the opportunity to consider the information and ask questions, which have been answered to my satisfaction.
- I understand that my data will be kept confidential, stored securely, and all efforts will be made to ensure I cannot be identified. I acknowledge that my anonymised information will be used in scientific publications, research and reports. I understand that I will be able to withdraw my data up until February 2021 by emailing the researchers.
- I understand that my email address is required to participate in this study. This is so that we can invite you to participate in three optional future time points of the survey (one per term). I understand that should I not wish to answer any other questions, I am free to leave them unanswered. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing my personal data.
- I agree that my pseudonymised research data (i.e. email address removed, identified by a study ID number only) may be used for future research.
- I agree to participate in this study.
- Please indicate below whether you would like your contact details to be retained, so that you can be contacted in the future by UCL researchers affiliated with this project who would like to invite you to participate in either follow-up studies to this project or future studies of a similar nature.

Please enter your email address below, so that we can contact you to complete the survey again in a few months

user@example.co.uk

Please enter an alternative contact email address. We may use this to contact you in the future, for example if you leave UCL before the study ends.

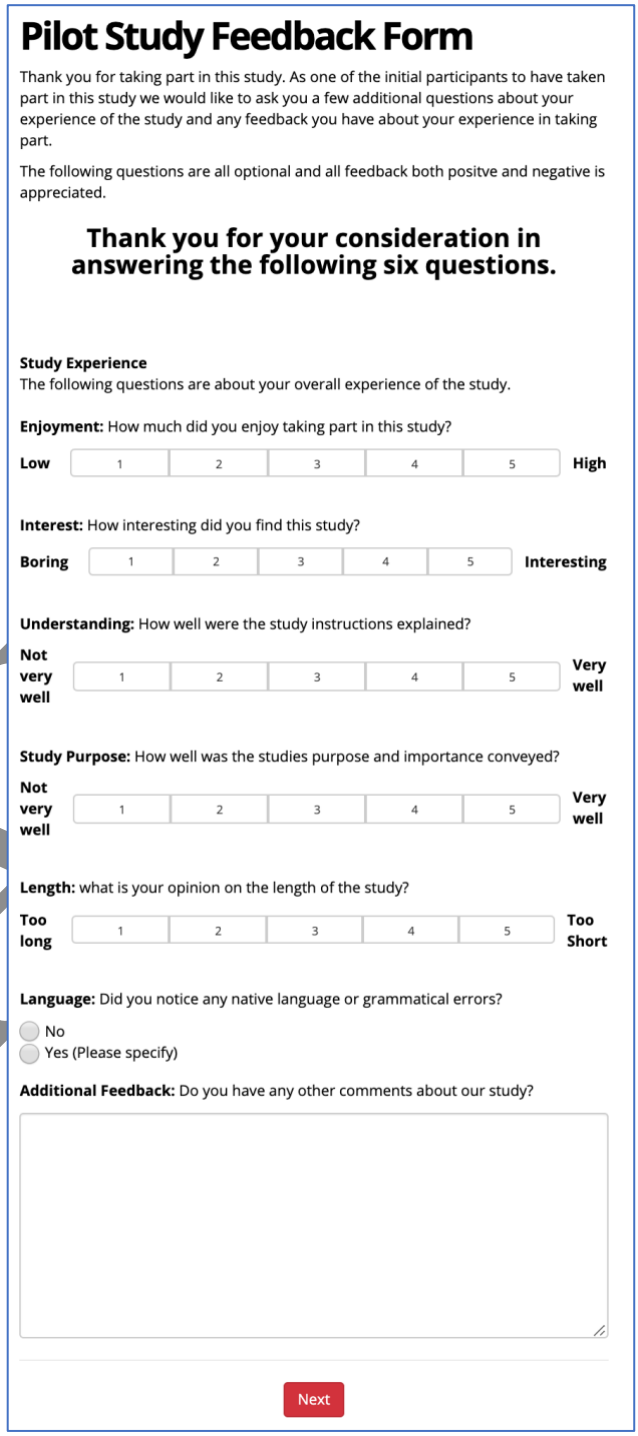
user@example.co.uk

Thank you.

You may now proceed to the next screen to start the survey.

Next

Figure 7: PPI Pilot Feedback Form



Pilot Study Feedback Form

Thank you for taking part in this study. As one of the initial participants to have taken part in this study we would like to ask you a few additional questions about your experience of the study and any feedback you have about your experience in taking part.

The following questions are all optional and all feedback both positve and negative is appreciated.

Thank you for your consideration in answering the following six questions.

Study Experience
The following questions are about your overall experience of the study.

Enjoyment: How much did you enjoy taking part in this study?

Low 1 2 3 4 5 High

Interest: How interesting did you find this study?

Boring 1 2 3 4 5 Interesting

Understanding: How well were the study instructions explained?

Not very well 1 2 3 4 5 Very well

Study Purpose: How well was the studies purpose and importance conveyed?

Not very well 1 2 3 4 5 Very well

Length: what is your opinion on the length of the study?

Too long 1 2 3 4 5 Too Short

Language: Did you notice any native language or grammatical errors?

No
Yes (Please specify)

Additional Feedback: Do you have any other comments about our study?

Next

4. Results

The primary results of this Pilot Study indicate the underlying software and hardware applications are properly provisioned and ready to deploy the anticipated PPI. The network, data storage and sorting architecture, combined with links to spreadsheet and analytics processed all benign pilot data nominally.

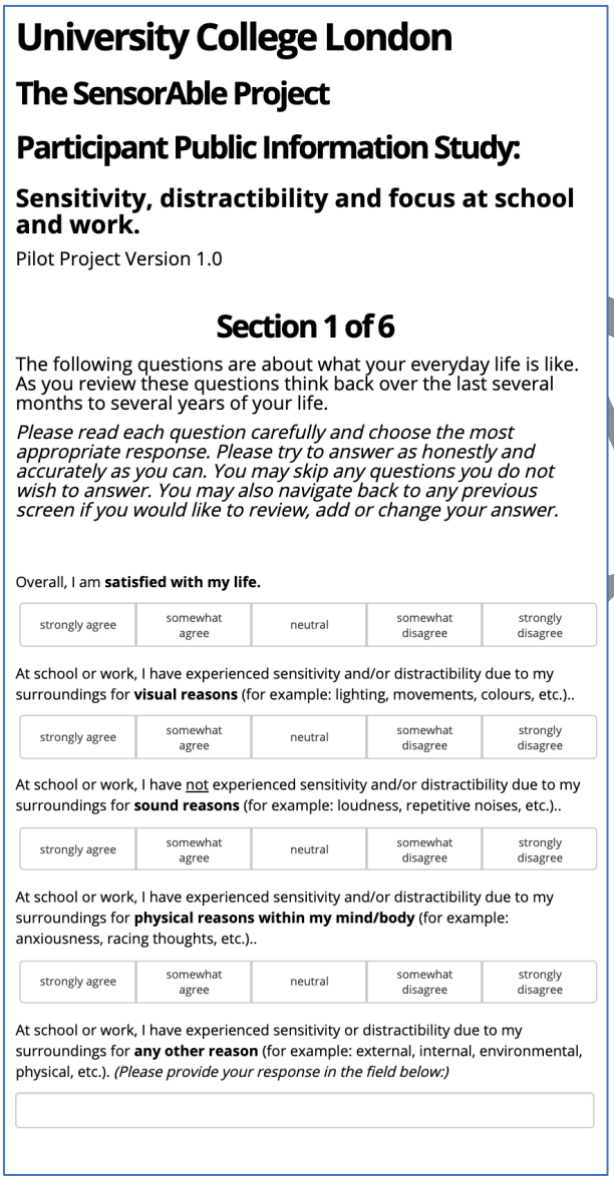
A limitation of this study is that the sample size may not provide ample network load and computer processing required to evaluate multiple and

simultaneous questionnaires. Given the PPI aspires to 10x the sample size of this study, researchers believe the system's framework contains ample headroom to carry out the proposed tasks, analyses and outcome measures—particularly when reviewing hardware, software and system published specifications.

5. Conclusion

Given the robustness and maturity of systems utilised, there is every reason to believe that the study theory, design and methodology will enable administration of the follow-on PPI. As the overarching PhD hinges on the PPI's success, the researcher expects the project to be both achievable as feasible.

Figure 8: PPI Pilot Typical Survey Screen



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