

**Recommendations for Using the IRAP with a Medicated In-patient Population with a
Diagnosis of Psychosis**

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Abstract

The current professional interest brief aims to outline the feasibility of using the Implicit Relational Assessment Procedure (IRAP) in a pilot study of individuals who heard voices and of whom the majority had been given a diagnosis of psychosis, and a comparison sample of non-voice hearing controls against which the clinical data could be compared (clinical voice hearers, $N=9$; controls, $N=9$). The IRAP assessed acceptance and avoidance of positively versus negatively valenced voices. All clinical participants completed the IRAP in terms of reaching the standard accuracy and latency criteria, thus demonstrating that a clinical (specifically psychosis) sample can complete content-specific IRAPs. Indeed, some procedural modifications were required and these have been outlined in the current manuscript. Preliminary results at both the group and individual levels appear to be in a meaningful direction for the psychosis sample, but not for the controls, which was consistent with our predictions. Our preliminary data support the view that the IRAP may be used effectively with a resident in-patient population.

Keywords: Clinical participants, psychosis, hearing voices, Implicit Relational Assessment Procedure (IRAP)

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Novelty and Significance

What is already known about the topic?

- The IRAP is a useful tool for investigating clinical phenomena.
- However, some populations have difficulty completing the IRAP, particularly those within an in-patient setting.

What this paper adds.

- The IRAP was successfully used within a medicated in-patient population with a diagnosis of psychosis.
- Preliminary data appears to be in a meaningful direction.
- Any necessary procedural modifications to the IRAP are outlined.

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Ethics

All procedures in the current study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants. All aspects of the study received prior ethical approval.

Acknowledgements

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The purpose of this professional interest brief was to investigate the feasibility of using the Implicit Relational Assessment Procedure (IRAP) with a clinical sample who heard voices and most of whom had received a diagnosis of psychosis. Derived from Relational Frame Theory (RFT), the IRAP is a methodology used to directly assess the strength of target verbal relations (Barnes-Holmes, Hayden, Barnes-Holmes, & Stewart, 2008; Hussey, Barnes-Holmes, & Barnes-Holmes, 2015). The procedure has shown robust effects in the study of many clinical phenomena (see Vahey, Nicholson, & Barnes-Holmes, 2015, for a recent meta-analysis). Despite this body of work, researchers have sometimes queried the feasibility of using the IRAP in clinical populations, specifically among those who are currently taking high doses of psychotropic medication. The administration of the IRAP is possible within clinical populations, but additional procedures are often implemented to ensure that participants meet the IRAP's practice block criteria of highly accurate responding within a brief response latency. The purpose of the current professional interest brief is to highlight additional procedures that are typically required, while presenting some preliminary data in this domain.

One particularly challenging clinical group, in terms of conducting experimental psychological research, would be those with a diagnosis of psychosis, because they are typically heavily medicated and present with experiences that might interfere with completion of experimental tasks. Perhaps for this reason, only one published paper has reported the use of the IRAP with a group reporting experiences that are typically associated with a diagnosis of psychosis, voice-hearing (McEnteggart, Barnes-Holmes, Egger, & Barnes-Holmes, 2016). In three studies, non-clinical voice hearers and controls were compared using IRAPs that assessed responses to voice hearing. The IRAP successfully predicted aspects of voice hearing and psychological well-being, but of course, all participants were non-clinical, and thus the relevance of this finding does not address directly

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the concerns sometimes raised by other researchers about the utility of the IRAP in the clinical domain.

In the current paper, we report the method we used and the data obtained from a clinical sample of voice hearers with the IRAP. Specifically, we used an Acceptance-Avoidance IRAP which contrasted avoidance and acceptance of positively and negatively valenced voices. The data we report were gathered with a small N and are used simply to demonstrate the feasibility of using the IRAP with a clinical sample who might be seen as a particularly challenging group. The data are compared, however, with a small control sample to determine if the general effects observed differ in a meaningful way between the clinical and non-clinical samples.

Method

Participants

The current study involved two groups of participants. One group was categorized as clinical voice hearers and the other comprised a non-voice hearing control group. Originally, 14 clinical voice hearers were recruited from a psychiatric facility, eight of these were male and six were female. Five of these participants were excluded from the study because they did not meet performance criteria on the IRAP. Therefore, nine clinical voice hearers successfully completed the study, five of these were male and four were female. Five out of the nine clinical voice hearers had an independent diagnosis of schizophrenia, while the remaining four had a diagnosis of: schizoaffective disorder, psychotic disorder (not otherwise specified), personality disorder, and substance dependence. All were taking psychotropic medication. Four participants were also diagnosed with comorbid substance dependence and substance abuse, and these participants were asked to abstain from drugs and alcohol prior to participation. All nine participants were administered stable doses of medication during the period of participation.

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Twelve non-voice hearers were recruited initially, five were male and seven were female. All were identified from the same general sample of undergraduate students, and self-reported that they had no previous contact with mental health services. Three of these participants were excluded from the study because they did not meet performance criteria on the IRAP. Therefore, nine non-voice hearers successfully completed the study, four of these were male and five were female.

Settings

The current study was conducted in two locations. The non-voice hearing controls participated in an experimental cubicle in a university. The clinical voice hearers participated in a research room in a psychiatric facility. All participation was on an individual basis. For the non-voice hearers, the experimenter interacted with participants only during instructional phases of the IRAP, and remained seated behind participants at all other times. On average, these sessions lasted between 30 and 60 minutes and, all participation was completed in one session. For the clinical voice hearers, it was necessary for the experimenter to interact with participants during all phases of the experiment. Participants were offered multiple opportunities to take breaks between the blocks of the IRAP, which significantly extended the duration of the experiment. On average, these sessions lasted between 1.5 and 4 hours (with regular breaks as requested) and all participation was completed in two to eight sessions.

Materials

The IRAP. The IRAP is a computerized procedure that presents stimuli and instructions, and records responses. The current study involved an Acceptance-Avoidance IRAP that assessed the avoidance and acceptance of voices. The Acceptance-Avoidance IRAP contrasted positive and negative voices, using the labels “If my voices are pleasant” and “If my voices are annoying”. Each trial-type presented one of these two category labels, accompanied by one of six avoidance-based (e.g., “I block them out”) or six acceptance-

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based target stimuli (e.g., “I cherish them”), with “True” and “False” as response options.

The Acceptance-Avoidance IRAP produced four trial-types: pleasant-accept; pleasant-avoid; annoying-accept; and annoying-avoid.

During blocks of trials that were deemed consistent with historical verbal relations for the clinical sample, the following responses were correct: Pleasant Voices-Accept/True; Pleasant Voices-Avoid/False; Annoying Voices-Accept/False; Annoying Voices-Avoid/True. During blocks of trials that were inconsistent with natural verbal relations, the following responses were correct: Pleasant Voices-Accept/False; Pleasant Voices-Avoid/True; Annoying Voices-Accept/True; Annoying Voices-Avoid/False. Defining relations as consistent or inconsistent for the control sample was difficult because they do not hear voices, but for the purpose of analysis, the IRAP relations are defined in the same way as for the clinical sample. A full list of label stimuli, target stimuli, and response options for the IRAP is provided in Table 1.

INSERT TABLE 1 HERE

In the interest of transparency, the current study employed a number of self-report measures, however due to the scope of the current professional interest brief, those data will not be presented. These measures comprised of: the Community Assessment of Psychic Experience (CAPE; Stefanis et al., 2002); the Auditory Hallucinations Ratings Scale (AHRS; Haddock, McCarron, Tarrier, & Farragher, 1999); the Beliefs About Voices Questionnaire-Revised (BAVQ-R; Chadwick, Lees, & Birchwood, 2000); the Voices Acceptance and Action Questionnaire (VAAS; Shawyer et al., 2007); the Acceptance and Action Questionnaire II (AAQ-II; Bond et al., 2011); and the Depression Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995).

Procedure

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Prior to commencing the experiment, participants were informed about the broad aims of the research and advised that at any time during the experiment they were free to discontinue participation. Confidentiality and anonymity were assured, and informed consent was obtained both through an informed consent form and via the IRAP program. The experimental session began once it was clear that all participants understood what was required of them.

Identification of non-voice hearers. All control participants were instructed that the experience of hearing voices was the focus of the study. However, in order to ensure that the study was accurately measuring appraisals to voice hearing as “auditory verbal hallucinations” and no other phenomena, all non-clinical participants were provided with a written explanation of voice hearing, and instructed that this was the focus of the study. Participants were then identified as non-voice hearing controls using the CAPE measure. Specifically, if participants indicated that they did not hear voices, they were allocated to the non-voice hearing group. If participants indicated that they *did* hear voices, their participation ended, and they were thanked and debriefed.

IRAP. Prior to the first practice block, participants were verbally instructed on how to complete an IRAP. That is, they were advised that each trial would present a phrase on top, with another phrase in the center, and that their task was to respond with “True” or “False”, as appropriate. Participants were informed that the pattern of responding would switch to an opposite pattern across each block. These instructions also highlighted the criterion for accurate (i.e., >80%) and fast (i.e., <2,000 ms.) responding. Some clinical participants found it difficult to remember which pattern of responding they were currently required to follow, so each participant was offered hardcopy post-it notes as a reminder of the two patterns (i.e., pro-pleasant voices/anti-annoying voices, and anti-pleasant voices/pro-annoying voices).

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The IRAP consisted of blocks of 24 trials, with each of the four trial-types presented six times within each block. On each trial, a label (e.g., “If my voices are pleasant”) appeared at the top, a target (e.g., “I accept them”) in the middle, and both response options (“True” and “False”) on the bottom left- and right-hand corners. Participants selected a response by pressing *D* (for the left option) or *K* (for the right). If a participant emitted a correct response, the screen cleared, and the next trial appeared. If a participant responded incorrectly, a red X appeared until a correct response was emitted.

The feedback contingencies for the IRAP alternated across blocks in one of two patterns. One pattern was defined as accept-pleasant/avoid-annoying voices, the other as accept-annoying/avoid-pleasant voices. The accept-pleasant/avoid-annoying voices pattern required that participants respond in the following way: Pleasant Voices-Accept/True; Pleasant Voices-Avoid/False; Annoying Voices-Accept/False; Annoying Voices-Avoid/True. The accept-annoying/avoid-pleasant voices pattern required the opposite: Pleasant Voices-Accept/False; Pleasant Voices-Avoid/True; Annoying Voices-Accept/True; Annoying Voices-Avoid/False. Hence, correct responding involved switching between each pattern from block to block. The order in which the two types of blocks were presented was counterbalanced across participants.

The IRAP commenced with a minimum of two practice blocks. If participants failed to achieve both accuracy and latency criteria across a pair of blocks, they received automated feedback, and practice blocks continued to a maximum of four pairs of blocks. Failing to meet the criteria after four pairs of practice blocks terminated participation and these data were discarded. When the criteria were reached on a pair of practice blocks, participants proceeded automatically to three pairs of test blocks. No performance criteria were employed for participants to progress through test blocks, but performance feedback was presented at the end of each block to encourage participants to maintain the criteria. The program

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automatically recorded response accuracy (based on the first response emitted on each trial) and response latency (time in milliseconds between trial onset and emission of correct response) on each trial. Once participants finished the IRAP, they completed the six explicit measures in a pre-determined sequence (AHRS, BAVQ-R, VAAS, CAPE, AAQ-II, and DASS), but as noted above, the data from these will not be presented here.

Procedural Modifications for the Clinical Sample

While the majority of clinical voice hearers employed in the current study successfully completed the IRAP, the long-term use of medication (which is often characteristic of this population) may influence participants' ability to complete the task within the IRAP's criteria. To circumvent these issues, a number of additional procedural measures were implemented to facilitate the successful completion of the task. It should be noted, however, that not all participants required these additional measures – a functional assessment of the participant's requirements was carried out on a participant-by-participant basis by an experienced researcher, and some of the following procedural modifications were made where necessary.

1. Due to the potential effects of medication on fatigue and motivation, the researcher aimed to schedule the experiment during the participants' optimum medication window. To do this, the researcher consulted with participants about their weekly schedule and then discussed the best time of day that they might like to complete the study.
2. All clinical participants were subjected to an *initial exposure* of the IRAP one week prior to the *actual exposure*. The initial exposure presented all aspects of the IRAP task (i.e., the practice and test blocks) to familiarize participants with all aspects of the task and to provide participants with an opportunity to ask

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questions. If participants met the IRAP criteria during the initial exposure, they were not required to complete the actual exposure one week later.

3. Given the sensitivity of the content of the IRAP stimuli, participants were assured that the IRAP was not designed to change their current beliefs about, or the way in which they respond to, their voices. Participants were simply informed during the debriefing session that the IRAP was designed to assess which pattern of responding they find easier, if any.
4. During any stages of the practice or test sessions, if participants appeared to be fatigued, they were offered an opportunity to take a break between the practice and test blocks of the IRAP. This significantly extended the duration of the experiment.
5. In the instance where participants found it difficult to remember which block of trials they were currently on, they were permitted to make *Post-it* notes of the two block patterns and alternate these on their screen between blocks.
6. Given the potential susceptibility of this sample toward paranoid experiences, participants were assured of the safety, anonymity, and confidentiality of their data, including who has access and where it will be stored. Participants were also assured that their data would not be used for diagnostic purposes, nor would it be analyzed on a single-subject basis.

Results

IRAP Data

Scoring of the IRAP was conducted using the standardized approach for transforming latency data into D_{IRAP} scores for each participant as outlined for previous IRAP studies (see Nicholson & Barnes-Holmes, 2012a). The foregoing data transformation yields positive D_{IRAP} scores for acceptance of voices and negative D_{IRAP} scores for avoidance of voices. All

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data from any non-voice hearing participant that fell below 80% accuracy and was above a 2000ms latency on any of the six test blocks were omitted from the dataset. However, if clinical participants fell below 80% accuracy and were above a 2000ms latency during the test blocks of the IRAP, their data were still included in the analyses if they remained above 75% accuracy and below 2500ms on each of the three test block pairs. Although somewhat arbitrary, adopting slightly relaxed criteria with this population is deemed acceptable, given that previous studies have reported slower reaction times in this sample on implicit and other measures (Wiffen et al., 2013).

Between groups data. The mean D_{IRAP} scores for the two groups on the Acceptance-Avoidance IRAP are presented in Figure 1. On Pleasant-Accept, the clinical voice hearers showed greater acceptance of positive voices than controls. On Pleasant-Avoid, both groups showed marginal acceptance of positive voices. On Annoying-Accept, the control group showed acceptance, whereas the clinical voice hearers showed almost no effect, that is, they did not confirm that annoying voices should be accepted any more quickly than denying this. On Annoying-Avoid, both groups showed avoidance, with the clinical group showing the smaller effect. Eight one-sample t-tests were conducted to investigate whether any of the observed effects were significantly different from zero, but only the Pleasant-Accept trial-type was significant for the clinical group ($df = 8$, $t = 2.268$, $p < 0.05$).

INSERT FIGURE 1 HERE

Clinical data from individual participants. The mean D_{IRAP} scores for each of the nine participants on the Acceptance-Avoidance IRAP are presented in Figure 2. Upon inspection of these data, it can be seen that there is a clear pattern on the Pleasant-Accept trial-type, in which eight out of nine participants (except P8) responded in a manner that showed acceptance of pleasant voices. A one-sample Wilcoxon Signed-ranks test indicated

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that the probability of acceptance of pleasant voices was significant for clinical participants ($p < 0.05$).

INSERT FIGURE 2 HERE

Control data from individual participants. The mean D_{IRAP} scores for each of the nine participants on the Acceptance-Avoidance IRAP are presented in Figure 3. Unlike the clinical data, there is no clear pattern on any of the four trial-types. Four one-sample Wilcoxon Signed-ranks tests indicated that the probabilities of each of the four effects were not significant (all $ps > 0.05$).

INSERT FIGURE 3 HERE

Discussion

The purpose of this professional interest brief was to investigate the feasibility of using the IRAP with a clinical sample who heard voices, had mostly received a diagnosis of psychosis, and were currently residing as in-patients. In doing so, we administered an Acceptance-Avoidance IRAP that contrasted avoidance and acceptance of positive and negative voices to a clinical sample of voice hearers and a non-voice hearing control group. Nine out of 14 clinical participants successfully completed the IRAP, and the preliminary IRAP effects recorded indeed appeared to separate out the clinical group from the control group on the Pleasant-Accept trial-type. Specifically, the probability of responding on this trial-type in a manner that is consistent with accepting pleasant voices was significant for the clinical group (8/9 cases). This difference was not found on any of the other trial-types.

Although post-hoc, a possible explanation for the reason that clinical participants showed a bias towards accepting pleasant voices is that these individuals were currently in therapy that sought to undermine or reduce avoidance in the presence of negative and unwanted voices, with little or no focus on positive voices (based on the assumption that positive voices do not cause distress). In this respect, it is interesting that on the Annoying-

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Avoid trial-type, the clinical group *did not* confirm that annoying voices should be avoided (avoidance would be typical of this population, see Brett et al., 2007). In contrast, the control group of non-voice hearers showed no clear pattern on any trial-type, suggesting that voice hearing trial-types of the IRAP were, perhaps, not particularly meaningful for them. Overall, our preliminary data support the view that the IRAP may be used effectively with a resident in-patient population, who are currently medicated, undergoing therapy, and are typically seen as having a very severe clinical diagnosis.

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Tables and Figures

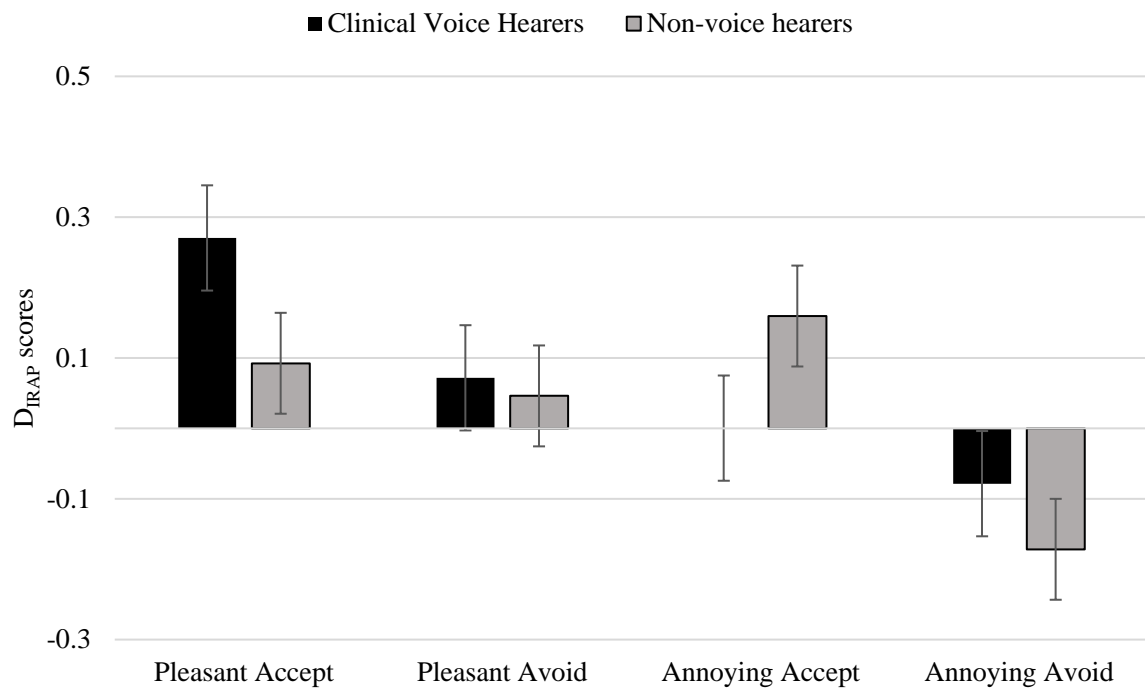


Figure 1. Mean D_{IRAP} scores for the two groups on the Acceptance-Avoidance IRAP. Positive D_{IRAP} scores indicate acceptance effects and negative D_{IRAP} scores indicate avoidance effects.

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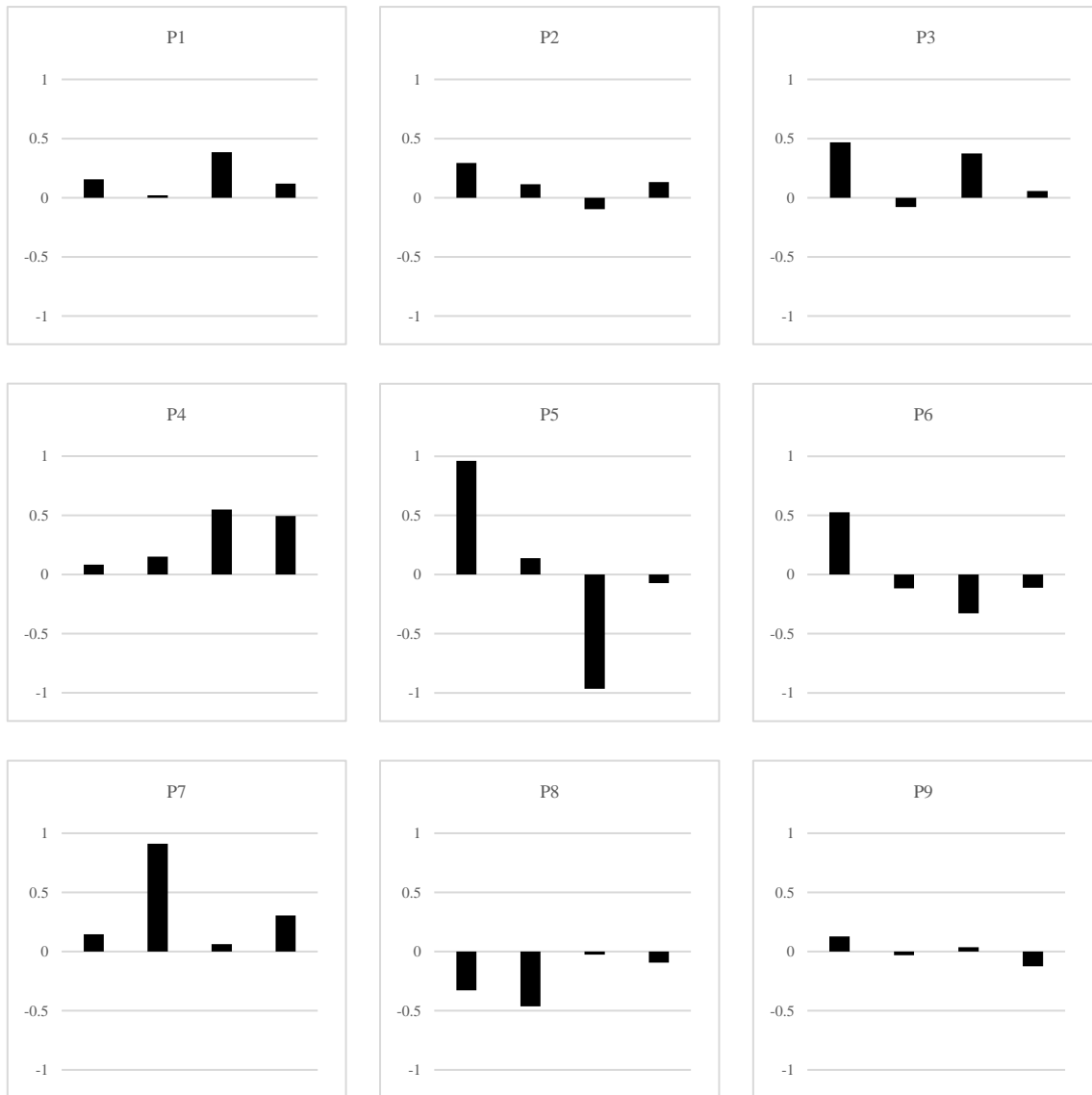


Figure 2. Mean D_{IRAP} scores for each of the nine clinical voice hearers on the Acceptance-Avoidance IRAP. The four trial-types from left to right are: Pleasant-Accept, Pleasant-Avoid, Annoying-Accept, Annoying-Avoid. Positive scores indicate acceptance effects and negative D_{IRAP} scores indicate avoidance effects.

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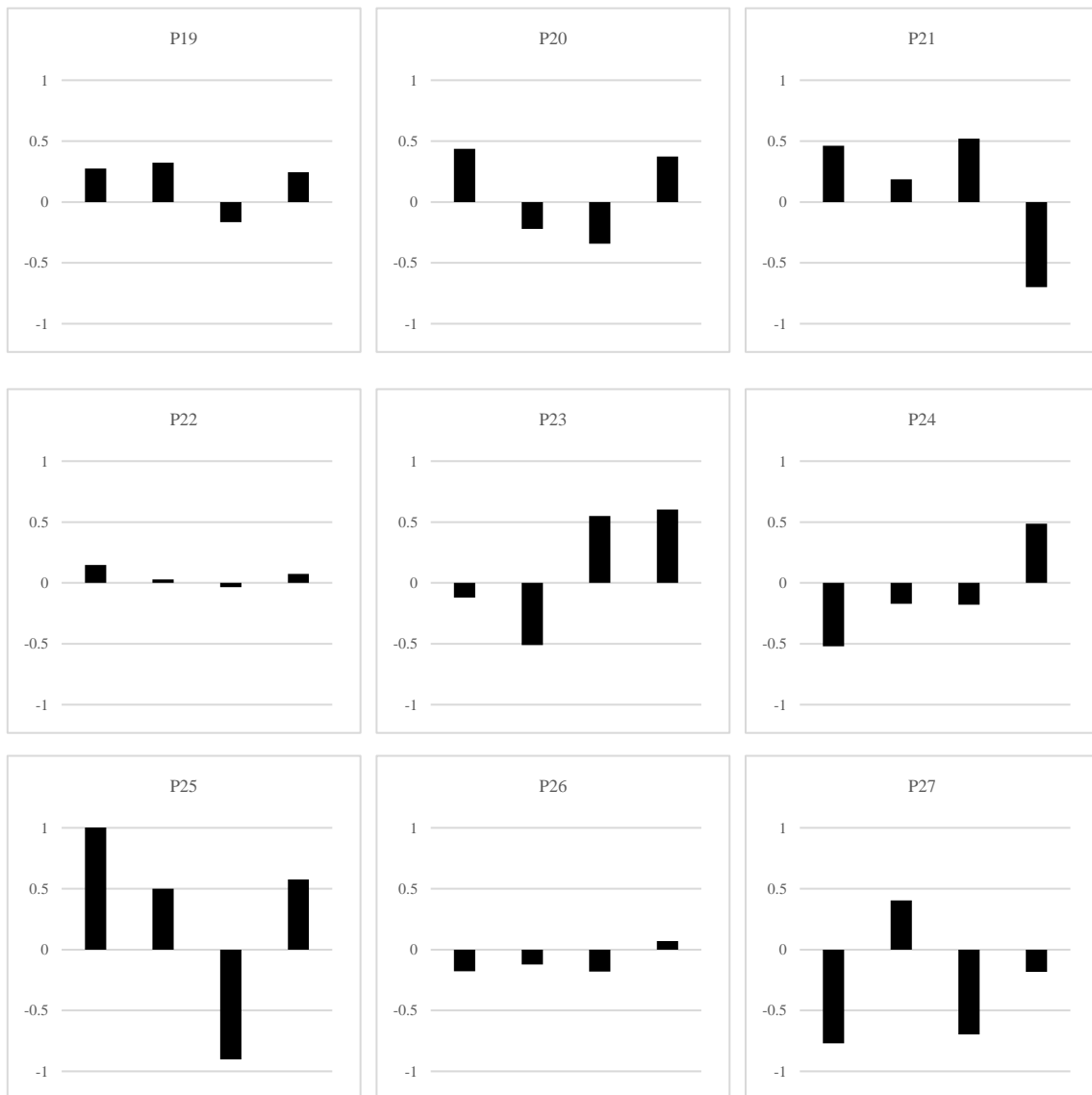


Figure 3. Mean D_{IRAP} scores for each of the nine non-voice hearers on the Acceptance-Avoidance IRAP. The four trial-types from left to right are: Pleasant-Accept, Pleasant-Avoid, Annoying-Accept, Annoying-Avoid. Positive scores indicate acceptance effects and negative D_{IRAP} scores indicate avoidance effects.

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Table 1

Stimuli and Response Options as presented in the Acceptance-Avoidance IRAP

If my voices are pleasant I	If my voices are annoying I
Welcome them Try to keep them Accept them Listen to them Cherish them Am open to them	Block them out Ignore them Suppress them Try to stop them Abstract myself Shut them up
True/False	