Introduction

Human communication is one of the most complex social activity: it is a process of meaning construction which cooperatively involves all participants taking part in the interaction. Various clinical conditions may lead to impairments of communicative abilities: developmental disorders (e.g., autism, specific language impairment, Down syndrome), brain pathologies (e.g., closed head injury, right hemisphere damage, aphasia), psychiatric disorders (schizophrenia), disorders of old age (e.g. dementia). The assessment of a patient’s abilities and disabilities is the crucial starting point for planning an efficient rehabilitation path, where residual capacities are strengthened and, whenever possible, impaired components are restored. However, while the phonological, syntactic and semantic components of language can be assessed by numerous tests, instruments for the evaluation of pragmatic aspects of communication are scarce (see Sacco et al., 2008 for a more detailed analysis of the existing instruments for the assessment of communication).

The Assessment Battery for Communication (ABaCo) has been created to be a theoretically grounded, wide-range clinical instrument. Its theoretical bases stem from Cognitive Pragmatics theory (Airenti, Bara & Colombetti, 1993; Bara, 2010), a theory of the cognitive processes underlying human communicative exchanges, framed within the inferential model of communication (Grice, 1975) and the speech acts perspective (Austin, 1962; Searle, 1969). The theory has been shown to be able to make predictions on typically developing children (Bucciarelli, Colle & Bara, 2003; Bosco, Bucciarelli & Bara, 2004; 2006; Bosco & Bucciarelli, 2008; Bosco, Vallana & Bucciarelli, 2012), atypically developing children (Bara, Bosco & Bucciarelli, 1999; Bara, Bucciarelli & Colle, 2001; De Marco, Colle & Bucciarelli, 2007), patients with traumatic brain injury (Bara, Tirassa & Zettin, 1997; Bara, Cutica & Tirassa, 2001; Angeleri et al., 2008), patients with right and left focal brain lesions (Cutica, Bucciarelli & Bara, 2006), patients with Alzheimer’s disease (Bara, Bucciarelli & Geminiani, 2000) and patients with schizophrenia (Bosco, Bono & Bara, 2012). In this view, communication is the ability to comprehend and produce linguistic and extralinguistic communication acts, accompanied by suitable paralinguistic features, appropriate with respect to discourse and social norms, and fluently integrated within the conversation. The ABaCo assesses each of these components, encompassing the major aspects involved in communication. In this paper, we will briefly describe the features of the battery, and summarize its psychometric properties, providing some suggestions for clinical application.

1. Basic speech acts have been proposed by Kasher (1981).

The Battery

The battery includes 5 scales: Linguistic, Extralinguistic, Paralinguistic, Context, and Conversation. As each scale, except Conversation, is divided into ‘comprehension’ and ‘production’, the battery comprises 9 subscales. Overall, there are 180 items: 72 are based on the examiner’s prompts, and 108 on videotaped scenes each lasting 20-25 seconds. Administration of the full battery takes about one and a half hours. However, the battery is modular, then it is possible to administer each scale separately to provide clinicians with a flexible tool. Performance is evaluated for each item on the basis of a series of dimensions, derived by the Cognitive Pragmatics theory, underlying the investigated communicative phenomena. Dimensions can be seen as the steps necessary to comprehend or produce the relative communicative phenomena; thus, the more complex the pragmatic phenomena, the more steps it will comprise.

The Linguistic and Extralinguistic scales assess the comprehension and production of communication acts, expressed respectively through spoken language (linguistic scale) or gestures (extralinguistic scale).

The following tasks are used to assess the comprehension of linguistic and extralinguistic acts.

- Basic communication acts (assertions, questions, requests, commands). In the linguistic scale, the examiner asks the patient to evaluate the truthfulness of assertions, to answer simple questions, to perform actions on request, to execute orders. In the extralinguistic scale, the examiner shows the patient short videos where an actor makes an assertion, asks a question, makes a request or issues a command through the use of gestures. The patient has to understand the act produced by the actor.
EXPERIENCES AND TOOLS

- Standard communication acts (simple, i.e. direct and conventional indirect, and complex, i.e. non conventional indirect) and non-standard communication acts (simple and complex irony; simple and complex deceits)\(^2\). The examiner shows the patient short videos where two agents are engaged in a communicative interaction: the actor asks her partner a question and the partner replies. The patient has to understand the communicative act produced by the partner.

The following tasks are used to assess the production of linguistic and extralinguistic acts.

- Basic communication acts. The examiner asks the patient to produce assertions, questions, requests and commands; the examiner provides the semantic content of the requested act. For example, the examiner asks the patient “Tell me whether it is sunny today” or “Tell me that it is sunny today”. The examiner asks the patient “Ask me whether it is sunny today” or “Tell me that it is sunny today”.

- Communication acts expressing an emotion. The examiner asks the patient to produce communication acts colored by a specific emotion or mood; the examiner provides the semantic content of the requested act and the emotion with which it has to be expressed. For example, the examiner asks the patient “Tell me that you have received a letter. Tell me that in an happy way”.

The Context scale assesses the adequacy/inadequacy of a communication act with respect to discourse norms and social norms.

The following tasks are used to assess the comprehension of discourse and social norms:

- Discourse norms\(^1\). The examiner shows the patient short videos where two agents are engaged in a communicative interaction: the actor asks her partner a question; the partner replies either according to the norms of discourse or giving a generic, false, irrelevant or ambiguous answer. The patient has to detect and explain the adequacy/inadequacy of the partner's reply. For example, in an item representing inadequacy with respect to the Gricean maxim of quantity, the actor asks “Where are you going precisely?” and the partner replies “I’m going out”.

- Basic communication acts. The examiner asks the patient to produce assertions, questions, requests and commands, paying special attention to the paralinguistic indicators; the examiner provides the semantic content of the requested act. For example, the examiner tells the patient "Order me to be quite". For example, the examiner asks the patient “Tell me that you have received a letter. Tell me that in an happy way”.

- Acts characterized by a paralinguistic contradiction. Acts characterized by a paralinguistic contradiction are acts in which the expressed content is in contrast with the paralinguistic indicators utilized in its production. For example, saying “I like it very much” while one’s voice and attitude reveal that one does not like it at all. The examiner asks the partner a question; the partner replies either according to the norms of discourse or giving a generic, false, irrelevant or ambiguous answer. The patient has to detect and explain the adequacy/inadequacy of the partner's reply. For example, in an item representing inadequacy with respect to the Gricean maxim of quantity, the actor asks “Where are you going precisely?” and the partner replies “I’m going out”.

The following tasks are used to assess the production of paralinguistic aspects.

- Discourse norms. The examiner asks the patient to produce assertions, questions, requests and commands; the examiner provides the semantic content of the requested act and the emotion with which it has to be expressed. For example, the examiner asks the patient “Tell me that you have received a letter. Tell me that in an happy way”.

- Acts characterized by a paralinguistic contradiction. Acts characterized by a paralinguistic contradiction are acts in which the expressed content is in contrast with the paralinguistic indicators utilized in its production. For example, saying “I like it very much” while one’s voice and attitude reveal that one does not like it at all. The examiner asks the partner a question; the partner replies either according to the norms of discourse or giving a generic, false, irrelevant or ambiguous answer. The patient has to detect and explain the adequacy/inadequacy of the partner's reply. For example, in an item representing inadequacy with respect to the Gricean maxim of quantity, the actor asks “Where are you going precisely?” and the partner replies “I’m going out”.

2 For definitions of standard vs. non standard, and simple vs. complex communication acts see Airenti, Bara & Colombetti, 1993; Bosco & Bucciarelli, 2008.

3 Here ‘discourse norms’ coincide with Grice's maxims (Grice, 1975); indeed, Gricean maxims establish the most important norms of discourse as they serve as rules for a rational and effective communication.
- Social norms. The examiner shows the patient short videos where two agents are engaged in a communicative interaction: the actor asks her partner a question; the partner replies either according to the norms of social appropriateness or in a manner which is not appropriate in the given social context. For example, the actor asks “Could you lend me your pen?” and the partner replies in a very impolite way “I don’t want to be disturbed!”

In order to assess the production of communication acts in accordance with the norms of social appropriateness, the examiner asks the patient to produce communication acts requiring different levels of formality/informality; the examiner provides the semantic content of the requested act.

The Conversation scale assesses the ability to appropriately participate in a conversation, complying with the topics of the discourse (topic maintenance, topic introduction/initiation, topic shift) and turn-taking (taking one’s turn, allowing the other person to have his turn, reference to interlocutor). Examiner and patient are engaged in a conversation, where the examiner introduces two topics, for a total duration of 4-6 minutes.

A detailed presentation of the battery has been presented in Sacco et al. (2008).

Psychometric Properties, Equivalent Forms, Normative Data

Psychometric measures of reliability, content validity and construct validity have been obtained on a non-clinical sample of 390 participants. The battery has shown to be a reliable tool for the evaluation of communicative abilities: the scales that make up the battery comprise coherent items; the internal consistency of the scales range from $\alpha = .52$ to $\alpha = .91$, satisfactory values as indicated by values of $\alpha > .5$. Actually, the values are all > .7, with the exception of the Context scale, which shows a lower internal consistency given the comparatively small number of items of this scale. Besides, experts in pragmatic language provided an independent validation of the content of the instrument: they judged the items to be appropriate, i.e. able to measure the pragmatic ability they are intended to address (each item was rated on a five-point Likert-type scale and all values across experts are > 4), and to be suitable for the developmental age as well as for adult patients (all values across experts are > 4). Finally, factor analysis indicated that one common ability underlines the entire structure of the battery (a one-factor solution accounts for 63% of the variance) suggesting that the theoretical construct is well-conceptualized and operatively well-defined. A detailed description of the psychometric properties of the battery can be found in Sacco and colleagues (2008).

Two equivalent forms of the battery have been constructed using the data from the same sample of 390 healthy participants, and then tested in a sample of 30 patients with traumatic brain injury. The two forms show good psychometric performance (for details, see Bosco et al., 2012). The development of such alternative forms of the test makes ABaCo a precious tool for the evaluation of communicative rehabilitation programs, as the two forms can be used at two different points in time, typically before and after the clinical intervention.

Normative data for individuals aged 15-75 have been computed on a sample of 300 healthy and cognitively intact participants of different ages and educational levels. The sample used to develop the norms was recruited according to the Italian National Institute of Statistics (ISTAT) indications so as to be representative of the population from which it was drawn. The main clinical utility of these norms is that they enable clinicians to determine the degree to which communicative abilities are impaired in patients of different ages and educational levels (the two variables found to affect participants’ scores) by comparing their scores against those achieved by the corresponding normative group. Norms are reported in Angeleri and colleagues (2012).

Conclusions

ABaCo is a clinical instrument of neuropsychological assessment which can be used either as a comprehensive battery for the evaluation of pragmatic impairment in patients with communicative disorders during the clinical assessment phase, or as a tool for evaluating the efficacy of a rehabilitation program. So far, the battery has been used to test communicative abilities in traumatic brain injury patients (Angeleri et al., 2008), schizophrenic patients (Colle et al., 2013), and work is in progress on other neurological and psychiatric populations. The battery is available both in paper form and in digital form, the latter allowing automated statistical analysis (Angeleri et al., in press).

References


EXPERIENCES AND TOOLS


SUMMARY. The Assessment Battery for Communication (ABaCo) is a clinical instrument for the evaluation of communicative abilities in patients with neurological or psychiatric disorders, such as aphasia, right hemispheric damage, closed head injury, dementia, autism and schizophrenia. ABaCo consists of 5 scales, assessing both comprehension and production of various kinds of pragmatic phenomena, using different means, such as linguistic, extralinguistic and para-linguistic communication. Normative data for individuals aged 15-75 have been collected: they enable clinicians to determine the degree to which communicative abilities are impaired in patients of different ages and educational levels by comparing their scores against those achieved by the corresponding normative group. Moreover, the battery comprises two equivalent alternative forms, so that patients can be assessed and re-assessed before and after a rehabilitation program, thus obtaining a reliable measure of treatment efficacy. This paper presents the battery and summarizes its properties and possible applications.

Keywords: assessment; communication

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