

A conceptual analysis of communicative spontaneity

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Communicative spontaneity is reported to present a significant problem for individuals with high support needs. Examination of literature addressing communicative spontaneity reveals conceptually opposing views of the phenomenon. Both the binary and the continuum conceptualisations are examined in this paper in specific relation to their logical consistency, explanatory power and limitations. It is argued that the continuum conceptualisation offers much greater explanatory power and facilitates understanding of communicative spontaneity. Several approaches to the operationalisation of the continuum approach are considered and contrasted. Limitations and problems with existing approaches to the operationalisation of spontaneity are explored and an alternative proposed.

Typically, individuals with high support needs have been labelled as having severe, profound or multiple disabilities (Carter & Hook, 1998). These individuals have been identified as being at risk of failing to use communication spontaneously (Calculator, 1988b; Calculator & Dollaghan, 1982; Carter, Hotchkis & Cassar, 1996; Halle, 1982; Halle, Marshall & Spradlin, 1979; Harris, 1982; Kaczmarek, 1990; Kozleski, 1991; Reichle, 1997; Reichle & Kaiser, 1990; Reichle & Sigafoos, 1991; Rowland & Schweigert, 1989; Sigafoos & Reichle, 1993). Spontaneity is a critical aspect of functional communication (Carter et al., 1996; Halle, 1987; Kaczmarek, 1990). Spontaneous communication gives individuals greater control over their environment (Carter & Grunsell, 2001; Carter et al., 1996; Halle, 1987; Kaczmarek, 1990) and reduces dependency on partners to anticipate communication (Carter & Grunsell, 2001). Spontaneous communication is recognised as a desirable goal for individuals with high support needs (Carter & Grunsell, 2001; Halle, 1987; Hubbell, 1977; Reichle & Sigafoos, 1991; Sigafoos & Reichle, 1993). In recent decades, individuals with high support needs have gained increasing access to augmentative and alternative communication systems. Further, it has been suggested that individuals relying on augmentative and alternative communication may be at increased risk of developing reactive patterns of communication (Carter, 1997; Rowland, 1990). Thus, our understanding of the

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nature of communicative spontaneity would appear to be a critical issue to the functional communication of persons with high support needs.

Examination of the extant literature addressing communicative spontaneity reveals conceptually opposing views of the phenomenon. Understanding of the nature of the phenomenon of communicative spontaneity and its appropriate measurement is pivotal to attempts to understand the purported deficits in communicative spontaneity. It is possible that an understanding of the nature of communicative spontaneity may provide some insight into appropriate intervention strategies. Two conceptual models of communicative spontaneity, the binary and the continuum models, will be examined in this paper. These models of spontaneity will be examined and evaluated in terms of their logical consistency and explanatory power. Limitations of each conceptualisation will be discussed, and strategies for operationalisation of the continuum model will be considered in depth.

Binary conceptualisation

Spontaneous or initiated communication (when discussing the binary conceptualisation of spontaneity, the terms “initiated” and “spontaneous” will be used interchangeably) has been nominated frequently as a dependent variable in research studies (see Table 1). The binary conceptualisation of spontaneity is implicit in an extensive range of research but has been subject to little explicit discussion. Rather, the perspective can be inferred from definitions or descriptions of “initiated” or “spontaneous” communication. Characteristic of the binary view of spontaneity is a dichotomy in which the learner is either spontaneous (and initiates) or is reactive (and fails to initiate). Typically, a single or a small number of possible antecedents have been examined. When these antecedents are present, communication is viewed as being reactive and conversely, when they are absent, communication is regarded as spontaneous or initiated.

Hubbell (1977) described spontaneous communication as acts that are not specifically elicited by controlling stimuli, are made by individuals of their own volition and are not purposefully elicited by the clinician. This perspective may be seen as binary in the sense that behaviour is judged as either spontaneous or not spontaneous. However, this conceptualisation is problematic from a number of perspectives. First, the definition is logically flawed as behaviour that is not related to any environmental or contextual cue may be regarded as bizarre or psychotic (Halle, 1987). Clearly, communication is often regarded as being spontaneous without being considered psychotic. Second, the definition is not operational in that the term “volitional” cannot be readily defined objectively and there is no specification of what constitutes elicitation by the clinician. With these considerations in mind, it is appropriate to limit further discussion to definitions that can be operationalised.

Numerous examples of studies are available that use operational definitions of spontaneity embracing a binary conceptualisation (see Table 1). Such definitions seem to possess one or more of several characteristics. Some researchers explicitly define initiated or spontaneous communication in terms of sequence, or more specifically, who communicated first in an interaction. In some cases, the introduction of a new topic has also been regarded as marking a spontaneous communicative act. Some researchers have specified a time period that must elapse between prompts, cues or partner behaviour, before a communicative act is considered spontaneous. Finally, spontaneous communication may be defined as acts that occur in the presence of a particular specified prompt (inferring the absence of others) or in the absence of some particular prompt. For example, Sigafoos and Reichle (1993) noted that communicative spontaneity variously has been defined as communication in the absence of a specific instruction to perform the behaviour, or, communication that is

Table 1***Examples of binary definitions of spontaneous or initiated communication***

Source	Definition and relevant contextual information	Definition addresses:			
		S	T	TP	P
Barrera and Sulzer-Azaroff (1983)	Labels item within 10 s "What's that?" cue in the absence of other vocal and gestural prompts.			#	#
Brady et al. (1995)	Intentional communicative act within 10 s of scripted interruption of behaviour chain.			#	#
Breen and Haring (1991)	Vocal or nonvocal behaviour that began an interaction (including topic shift or recommencement of interaction after break).	#	#		
Buzolich et al. (1991)	Comments in the absence of defined prompts (expectant delay, open-ended question, suggested response and modelling of response using student's system).				#
Calculator (1988b)	Communication that commenced conversation or changed topic.	#	#		
Carr and Kologinsky (1983)	Item requests in response to partner proximity and eye contact.				#
Cavallaro and Bambara (1982)	Verbalisation not preceded within 3 s by any question, prompt or model.			#	#
Chadsey-Rusch et al. (1993)	Unprompted requests for assistance in predetermined probe situations.				#
Charlop et al. (1985)	Request within 10 s of object presentation in the absence of partner verbal cues.			#	#
Charlop and Trasoweck (1991)	Speech (in natural settings) in the absence of partner verbal cues.				#
Dicarlo and Banajee (2000)	Communication not following verbal and visual prompting from an adult.				#
Dyer et al. (1991)	Communication not preceded within 3 s by prompts, mands, models or time delay where any referent objects present were in natural location.			#	#
Duker and van Lent (1991)	Communication not preceded by questions or any other type of prompting where referents were not visible.				#
Duker et al. (1994)	Communication not preceded by partner verbal request, prolonged eye contact, pointing to object, modelling or physical assistance.				#
Dattilo and Camarata (1991)	Communication that introduced new information (as opposed to semantically affirm or modify) and was not directly contingent on partner communication (i.e., within 2 s).	#	#	#	
Dyer (1989)	Communication in the presence of referents not preceded by partner verbalisation within 10 s.			#	#
Grenot-Scheyer (1994)	Communication not in acknowledgement of a previous partner communication and for which no social behaviour occurred in the preceding 5 s.	#		#	
Leung (1994)	Non-imitated acts within 10 s with partner holding referent out of reach.			#	#
Glennen and Calculator (1985)	Topic introduction, unrequested new information on topic or redirection of topic.		#		

Source	Definition and relevant contextual information	Definition addresses:			
		S	T	TP	P
Goldstein and Ferrell (1987); Goldstein and Wickstrom (1986)	Communication not preceded within 3 s by partner communication.	#		#	
Halle et al. (1981)	Contextually appropriate communication within 5 s of time delay procedure without any other form of prompting.			#	#
Haring et al. (1986)	Contextually appropriate communication that began a conversation, changed topic or instructed the commencement of an action.	#	#		
Hamilton and Snell (1993)	Communicative act in response to contrived or natural situation within 5 s of partner noticing orientation towards object, person or activity and prior to defined prompts (expectancy, expectancy plus question, expectancy plus mand, expectancy plus mand and model).			#	#
Hughes et al. (1995, 1996)	Communication directed toward partner introducing new information, new topic or topic expansion or not preceded by partner verbalisation by 15 s.	#	#	#	
Krantz and McClannahan (1993)	Understandable statements or questions that were (a) unprompted by an adult, (b) involved use of partner's name or facing him/her, (c) separated from speaker's previous vocalisation by change of topic or partner.		#		#
Laski et al. (1988)	Vocalisations that did not have an immediate verbal discriminative stimulus but were related to context.				#
Light et al. (1992)	Communicative acts that were first turns in a conversation, introduced a change of topic or followed a pause of greater than 2 s.	#	#	#	
Matson et al. (1993)	Target communication within 10 s of presentation of nonverbal stimulus and prior to verbal model.			#	#
Ogletree et al. (1992)	Intentional topic initiation or communication not preceded by partner speech.	#	#		
Peck (1985)	Student communication not preceded by teacher directives, choice statements, offers of assistance or objects, or other direct or indirect communicative prompts within 10 s.			#	#
Pecyna Rhyner et al. (1990)	Behaviour used to obtain and/or direct partner's focus of attention when there was not ongoing interaction between parties.	#			
Rice et al. (1990)	Verbal attempt to begin interaction with another person or general verbalisation directed at unspecified partner.	#			
Romer and Schoenberg (1991)	Subject communication separated by more than 15 s from staff communication.	#		#	
Romski et al. (1994a,b, 1999)	Utterance occurring at least 5 s after last partner utterance.	#		#	
Simic and Bucher (1980)	Defined communicative acts in response to reinforcer presentation (without adult vocal cues).				#
Yoder and Warren (1999)	Communication not occurring directly after an adult prompt				#

S = sequence of interaction, T = topic introduction, TP = time period specified between prompt and act, P = specified prompts present or absent.

not preceded by a question. An illustrative sample of definitions of initiated or spontaneous communication (including relevant contextual information) is included in Table 1. Further, each definition is classified in terms of whether it addresses (1) the sequence of interaction, (2) includes topic introduction, (3) specifies a time period between provision of a prompt and the communication of interest, and (4) defines specified prompts that must be present or absent.

It is evident from Table 1 that there has been a substantial range of definitions of initiation or spontaneity employed in the sample of studies examined. The specification of a particular prompt associated with spontaneous communication and a time period was often, although not exclusively, associated with discrete trial format research (e.g., Charlop, Schreibman & Thibodeau, 1985). Studies making more naturalistic observation often just defined a prompt, in the absence of which communication was considered spontaneous or initiated (e.g., Charlop & Trasowech, 1991; Duker & van Lent, 1991). Quite a number of studies were concerned with conversational interactions and such research tended to adopt definitions associated with sequencing of turns or topic shift (e.g., Dattilo & Camarata, 1991; Haring, Roger, Lee, Breen & Gaylord-Ross, 1986). However, the common characteristic of all definitions was the treatment of spontaneity or initiation as a binary variable such that communicative acts were either initiations or responses.

Presumably, within a binary approach a primary mechanism for the development of spontaneity would involve the transfer of control from those antecedents that mark communication as reactive to those that mark it as spontaneous or initiated. Such transfer could be accomplished with use of any conventional response or stimulus prompting and fading strategies (see Alberto & Troutman, 1999). Naturalistic time delay (Halle, 1982, 1984; Halle, Alpert & Anderson, 1984; Halle, Baer & Spradlin, 1981; Halle et al., 1979; Kozleski, 1991; Turnell & Carter, 1994) and the verbal-free prompt strategy (Mirenda & Dattilo, 1987) are specific examples of techniques designed to transfer stimulus control from the verbal prompts of the teacher to other controlling stimuli, such as the presence or attention of a partner or the presence of an item. It is also possible that the controlling antecedents for communication marked as spontaneous could include setting factors such as establishing operations. Transfer of control to establishing operations has been demonstrated in a number of studies using prompt fading procedures such as time delay (Hall & Sundberg, 1987; Sigafos, Doss & Reichle, 1989).

Limitations of the binary conceptualisation

There may be some doubt as to whether the binary perspective on spontaneity is really a premeditated conceptualisation. The binary conceptualisation of spontaneity has been inferred from the operational definitions and descriptions of "spontaneous" or "initiated" communicative behaviour used in research studies. In fact, it may be more appropriately viewed as an artefact of the absence of a clear conceptualisation of spontaneity. Nevertheless, it would appear that much existing research that examines communicative spontaneity does so from a binary perspective.

If the process of developing spontaneity is accepted as involving transfer of control from defined antecedents, two fundamental problems arise within a binary conceptualisation. The first is how to determine exactly which antecedents will be indicative of whether communication is spontaneous. It is somewhat surprising that little, if any, justification has been offered in the extant studies adopting a binary conceptualisation for the particular antecedents selected to define a communicative act as either spontaneous or reactive. This would seem a central issue in a binary approach. Why are particular antecedents deemed

to be indicative of a “spontaneous” communicative act and how are these justified? An examination of Table 1 reveals a wide range of definitions and, on face value, it might be questioned whether they were all measuring the same underlying construct. In any case, individual definitions would appear to offer a very restricted view of the phenomenon. A practical example of the difficulties associated with a binary conceptualisation of spontaneity was provided by Carter et al. (1996). They attempted to analyse naturalistic observational research examining communicative spontaneity of augmentative and alternative communication users with severe disabilities. Existing research exclusively adopted a binary perspective with greatly varying definitions of spontaneity. Consequently, it was not possible to draw clear conclusions regarding the nature of spontaneity in this population.

The second fundamental issue is determining exactly where control should be transferred. It seems inadequate to simply state that control should be transferred to stimuli other than those that define a communicative act as reactive (e.g., a partner question). For example, is a communicative act in response to the ritualised presentation and/or withholding of a desired item (e.g., Charlop et al., 1985; Leung, 1994) or deliberate withholding of an item needed to complete an activity (e.g., Hall & Sundberg, 1987; Sigafoos et al., 1989; Sigafoos, Reichle, Doss, Hall & Pettitt, 1990) really more spontaneous than an act cued by a partner verbalisation? In terms of the ability of individuals to control their environment, the end result would appear to be similar in that learners are still dependent on a partner to anticipate a need and systematically manipulate antecedent events. Thus, whilst spontaneity may be viewed as developing through the mechanism of transfer of control, from a binary conceptualisation (i.e., to either a discriminative stimulus or establishing operation), limited and inadequate insight is provided into where control should be transferred.

A binary conceptualisation of spontaneity is inadequate and potentially can be misleading in terms of the functionality of communicative acts, depending on exactly what antecedents are accepted as consistent with spontaneous behaviour. In a complex social-communicative environment, a wide range of factors are likely to influence the probability of communicative behaviour (Halle, 1987; Kaczmarek, 1990). Determining whether a communicative behaviour is spontaneous on the basis of a single or small group of antecedents may represent an oversimplification of complex phenomenon.

Continuum conceptualisation

An alternative to the binary model has been proposed where spontaneity is viewed as a continuum (Charlop et al., 1985; Halle, 1987) on which the intrusiveness of occasioning events is the salient dimension (Halle, 1987). It is assumed that communicative behaviour is related to environmental events, even if only indirectly, as in the case of responses to hunger or thirst, where deprivation may be regarded as an environmental antecedent (i.e., unconditioned establishing operation). Central to this model is a continuum of antecedent controlling stimuli, against which the spontaneity of a particular communicative act can be determined. Within a continuum conceptualisation, communication would not be described as initiated or responsive; rather, a level of spontaneity would be ascribed to a communicative behaviour based on the prevailing antecedents. The level of spontaneity would be judged in terms of the intrusiveness or obviousness of controlling stimuli. The “most” spontaneous communicative acts may be those in response to interoceptive stimuli, such as hunger or thirst (Charlop et al., 1985; Halle, 1987). In these cases, no specific occasioning stimuli may be identified at the time of responding other than a general context that would indicate that communicative behaviour was appropriate. Observation over an extended

period might reveal that a state of deprivation (unconditioned establishing operation) had occasioned the communicative act. Conversely, the least spontaneous communicative acts may be in response to relatively intrusive occasioning events such as conventional physical prompts or requested imitation.

It is critical to note that spontaneity is not seen as an all-or-none phenomenon, but a continuous variable (Kaczmarek, 1990). Within the continuum model, the terms initiation and response are redundant. Rather, communication can be characterised in terms of the level of spontaneity that is evaluated by the obviousness of controlling antecedents. An appropriate training objective might be to move individuals up the continuum so that communication could be controlled by less intrusive stimuli (Halle, 1987). In addition, different levels of spontaneity may be appropriate in particular situations. Halle (1987) offers the example of ordering in a restaurant. In many situations it might be appropriate to wait for the waiter to ask before making an order. However, the individual might be in a hurry and in this case it would be preferable also to have the skill to gain the waiter's attention and then place an order. It should be clear that, ideally, an individual would be able to generate an appropriate communicative act to the full range of stimuli on the spontaneity continuum.

It may be appropriate to define spontaneity as the degree to which an observer can discern controlling conditions. Operationalising the definition, however, requires a specific continuum of stimuli characterised by their degree of explicitness. A number of such taxonomies for organising antecedents in a continuum model will be considered in the following section.

Taxonomies for operationalising a continuum model

Similarly to the binary conceptualisation, the development of spontaneity within a continuum conceptualisation can be seen as involving a transfer of control. In this instance, however, it does not involve transfer from a single predefined stimulus. Rather, it can be viewed as the process of establishing less intrusive sources of control of communicative behaviour. That is, the development of communicative spontaneity can be viewed as a process of transferring control from more intrusive events to less intrusive cues. In effect, the continuum conceptualisation provides an indication of where control should be transferred, at least in terms of direction. The particulars of transfer will depend, however, on the detail of the taxonomy of stimuli used. Three different taxonomies will now be considered, each of which presents stimuli sequenced according to presumed explicitness. In addition, the potential for operational use of each of these taxonomies for assessment of spontaneity will be explored.

Halle's continuum. Whilst Charlop et al. (1985) provided earlier discussion of a continuum model of spontaneity, Halle (1987) offered a far more detailed exploration of the model and a particularised taxonomy of stimuli. An overview of the taxonomy is presented in Fig. 1. The first two levels on Halle's continuum (physical guidance and modelling) represent the lowest levels of spontaneity and consist of standard prompting strategies. The third level involves questions (e.g., "What do you want?") and mands (e.g., "Tell me what you want") by a partner. Whilst questions or mands may occur with some frequency in regular interactions, they have also been identified as developing an inappropriate level of control for some individuals with high support needs (for example, see Halle, 1982, 1989; Halle et al., 1981; Locke & Mirenda, 1988; Mirenda & Santogrossi, 1985). The presence

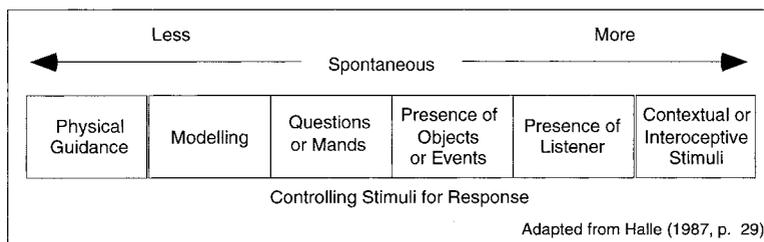


Figure 1.

Halle's taxonomy of controlling stimuli.

of objects or events represents the next level on the continuum. Halle (1987) provided an example of a teacher holding a cookie up in front of a learner to illustrate this level of controlling stimuli. In this example, the relevant object is quite intrusive and is being deliberately manipulated by the teacher. Objects or events may be present, but much less intrusive. For example, an object may be present but several feet away, partially obscured or briefly presented and then removed. In relation to the fifth level on the continuum, the presence of the listener, Halle suggested that both proximity and attending behaviours of the partner might be salient variables. Halle (1987) explicitly acknowledged that in the first four levels of the continuum, it is assumed that the partner is present, in close proximity and attending to the learner. The final level on the proposed continuum, reflecting the highest level of spontaneity, is interoceptive and contextual cues. Interoceptive cues may be seen as reflecting unconditioned establishing operations such as deprivation of food or water. Contextual cues are less well defined by Halle (1987) but seem to refer to general characteristics of the setting that might occasion communication. For example, a request for food might be more likely in the kitchen than on a commuter train.

Operationalising the continuum presented by Halle (1987) presents several difficulties. Halle (1987) acknowledged problems with variability in his continuum. Factors such as listener proximity, attention, as well as the proximity and saliency of objects or events may vary at each level. For example, even at a lower level of spontaneity there is a possibility that a communicative act may be influenced by listener attending behaviour such as attention and expectancy (i.e., an expectant expression). There may also be considerable variation within a level on the continuum. For example, in the fourth level of the continuum there may be great differences in both proximity and saliency of the objects or events of concern. Further, evaluation of interoceptive states may be problematic (Sigafoos & Reichle, 1993) and this presents a further difficulty with the proposed continuum. In effect, aspects of the continuum lack adequate detail or are difficult to operationalise. In defence of Halle's continuum, it should be stated that it appears to have been developed primarily as an explanatory tool for the conceptual model, rather than as a practical instrument.

Kaczmarek's matrix model. The model of Kaczmarek (1990) overcomes some criticisms of Halle's (1987) continuum in that it incorporates a much wider range of occasioning events and provides a more detailed analysis of these events. The model details a range of possible occasioning variables for communicative behaviour but maintains a hierarchy of spontaneity within each, consistent with a basic continuum conceptualisation of spontaneity.

Key features of the matrix model are that it divorces listener preparatory behaviour from other environmental variables that may influence perceptions of spontaneity and provides a more complex consideration of variables. The approach is described as a matrix model because the partition of listener preparatory behaviour from other environmental variables suggests an intervention matrix involving simultaneous manipulation of each set of variables (Kaczmarek, 1990). An overview is presented in Table 2 of the three basic listener preparatory variables (selecting a listener, establishing proximity and obtaining attention) and variables affecting their display. Similarly, an overview of possible contextual variables that might affect object requests is presented in Table 3. In Tables 2 and 3, the left columns describe the specific variable under examination, while more "difficult" or abstract aspects of each continuum are represented by cells toward the right of the table and less difficult aspects toward the left. In Table 2, most of the variables under consideration are either operationally defined (e.g., nature of ongoing activity of selected listener) or could be subject to operational definition relatively easily (e.g., familiarity of potential listener, attention state of selected listener) as could most environmental variables described in Table 3. An example of the operational use of these variables is provided in the study of Kaczmarek, Evans and Stever (1995).

The matrix model certainly provides an extremely useful analysis of many variables that relate to spontaneity and provides a starting point for assessment. The importance of partner behaviour in communication of individuals with disabilities has received increasing attention over the past decade or so (see Arthur, 1994; Butterfield & Arthur, 1995; Calculator, 1988a; Calculator & Dollaghan, 1982; Carter & Maxwell, 1998; Goldstein & Kaczmarek, 1992; Kraat, 1987; Light, 1988; Light & Collier, 1986; Light, Dattilo, English, Gutierrez & Hartz, 1992; McNaughton & Light, 1989; Mirenda, Iacono & Williams, 1990; Ostrosky, Kaiser & Odom, 1993) and the detailed analysis of variables related to listener preparatory behaviour offered by Kaczmarek's (1990) matrix model underscores this critical role. A particular feature of the matrix model that will facilitate such research is the detailed consideration of listener preparatory variables that are relatively accessible to operational definition. It is possible that systematic manipulation of listener preparatory variables, such as the partner's proximity and focus of attention, may be used to assist students to move along a continuum of spontaneity. This would appear to be a valuable area for future research.

However, there are some difficulties with the model and some limitations. In relation to the issue of measurement of communicative spontaneity, the detailed and separate analysis of variables presented by Kaczmarek (1990) overcomes the problem of substantial variability that could be evidenced at each level of Halle's (1987) continuum, but in doing so creates a new problem. Ideally, for data on spontaneity to be useable practically, some simple form of summary is needed. Within the matrix model, each variable has its own continuum and each communicative act can be measured against each variable. Take, for example, the seven specific listener preparatory variables and the further 13 other specific environmental variables related to requesting objects described in Tables 2 and 3. Clearly, there are an enormous number of variables against which judgements regarding spontaneity must be made. The obvious difficulty in terms of measurement of spontaneity is synthesising these data into a useable, and preferably unitary, metric to summarise spontaneity. How could the large number of variables be incorporated into a useable evaluation of spontaneity and how should each factor be weighted? The matrix model has the potential to provide a great deal of detail on factors that precipitate communication, but this complexity of analysis makes it difficult to generate a useful metric or summary statistic for overall spontaneity of a particular communicative act.

Table 2
Listener preparatory variables

Class	Factor	Example of measurement		
		←		→
Selecting a listener	Number of potential listeners	None	1	3 or more
	Familiarity of potential listeners	Regular partners	Occasional communicative partners	Strangers
Establishing proximity to selected listener	Role or function of potential listeners (number of listeners to which message is appropriate)	None	1	3 or more
	Proximity of selected listener	Within conversational distance		Not within conversational distance
Obtaining attention of selected listener	Type of setting	Setting broadly defines conversational distance		Setting narrowly defines conversational distance
	Nature of ongoing activity of partner	Not engaged in activity		Engaged in activity
	Attention state of partner	Attending to speaker		Not attending to speaker

Adapted from Kaczmarek (1990, p. 163).

Table 3
Environmental factors affecting requests for objects

Class	Factor	Example of measurement			
		←			→
Possible referents	Position	Within reach	Partly in view	Briefly in view	Out of reach
	Visibility	Full view			Not in view
Selected listener	Sensory modes other than visual	2		1	0
	Number of choices	1	2	3	4 or more
Setting characteristics	Verbal behaviour	Models request	Direct cue for request	Indirect cue for request	None
	Nonverbal behaviour	Offers choice of referent		Acting on possible referent	Neutral
	Age of partner	Older		Peer	Younger
Representation of objects relating to referents	Familiarity of partner	Familiar frequent partner		Familiar infrequent partner	Stranger
	Number of irrelevant cues History relative to setting	Few		Moderate	Many
Representation of objects relating to referents	Level of representation	Objects	Models	Photos	Pictures
	Position	Within reach			Out of reach
Representation of objects relating to referents	Visibility	Full view	Partly in view	Briefly in view	Not in view

Adapted from Kaczmarek (1990, p. 163).

Four-level antecedent hierarchy. An approach to the measurement of spontaneity has been proposed by Carter (1997). The previously considered taxonomies are problematic in regard to the practical and operational measurement of communicative spontaneity related to the level of detail they consider or the generation of a summary statistic. However, it is possible to organise antecedents logically in a different manner, within broad classes of cues and prompts that have functional similarities (Carter, 1992, 1997). To this end, an example of a four-level taxonomy of environmental antecedents is presented in Table 4. Four broad classes of antecedents are described, and some examples of the specific variables that can be measured at each level are offered.

The first level on the hierarchy is natural cues. Natural cues are those that are present in the usual environment in which the skill would be performed (Browder & Snell, 1983) and such cues may vary according to the age of the individual (Billingsley & Romer, 1983). For the purposes of this hierarchy, natural cues could be defined as those that have a high probability of being present in the environment of an age-matched non-disabled peer and that are likely to occasion communication. They might include the presence of relevant materials, activities and persons. These antecedents would be considered least intrusive and communicative acts in response to such cues, most spontaneous.

Stimulus highlighting is the second level on the hierarchy. As opposed to attempting to prompt the learner directly, stimulus highlighting techniques attempt to draw attention to natural stimuli by systematically accentuating them in some way. For example, the proximity of materials or activities might be systematically manipulated to increase their saliency to the learner. Alternatively, comments about aspects of the natural cues might be offered to draw attention to them. Most such procedures could be regarded as stimulus prompting (Alberto & Troutman, 1999) or stimulus manipulation techniques (Wolery, Bailey & Sugai, 1988). The techniques proposed in the current hierarchy can be used to either manipulate the number of antecedent stimuli available to the learner or their saliency. Manipulations of environmental stimuli have been reported in the extant literature, but research has been limited (Hemmeter & Kaiser, 1994; Kaiser, Ostrosky & Alpert, 1993), except possibly in the context of the behaviour chain interruption strategy (see Carter & Grunsell, 2001). Strategies have included the placement of materials to make their reinforcing properties as salient as possible (Hart, 1985), placing items in sight but out of reach (Alwell, Hunt, Goetz & Sailor, 1989; Halle et al., 1979; Haring, Neetz, Lovinger, Peck & Semmel, 1987; Hart & Rogers-Warren, 1978; Kaiser, Hendrickson & Alpert, 1991), providing contextually inappropriate materials (Haring et al., 1987) and providing incomplete materials (Duker, Kraaykamp & Visser, 1994; Hall & Sundberg, 1987; Hunt, Goetz, Alwell & Sailor, 1986; Kaiser et al., 1991, 1993). However, with the possible exception of the first mentioned strategy, none of these techniques are specifically intended to draw attention to natural environmental cues. This is a distinguishing feature of the stimulus highlighting procedures described here. The effects of manipulations of environmental stimuli have been subject to limited empirical investigation in isolation and have not been systematically investigated in relation to spontaneity.

The final two levels on the hierarchy involve more intrusive prompting of the learner. The third level of antecedents that may occasion communication are generalised communicative cues. This form of antecedent provides prompts to the learner but does not mandate the specific content of the communicative behaviour required. That is, generalised communicative cues are signals from a partner that indicate a communicative response is required or anticipated but do not designate the specific behaviour. A common form of such prompting is the question (e.g., "What do you want?") or mand (e.g., "Tell me what you want"). In these instances, there is an obligatory requirement for communication from the

Table 4
Four-level antecedent hierarchy

Level	Definition	Example of variable	Description	Example
1. Direct prompting	Prompts with the primary intent to directly elicit a specific communicative act by the learner and specify the content and/or form of the act.	Physical prompt Instruction	Physical contact directed at occasioning a specific communicative act. Learner is instructed to perform specific communicative act.	Teacher physically assists student to form a sign or point to a specific symbol. Teacher says "Sign biscuit".
2. Generalised communicative cue	Deliberate general signals that indicate a communicative act is required or anticipated but do not designate a specific communicative act.	Question or mand System presentation Expectancy	Learner is asked question or mandated to produce a communicative act. Aided communication system is presented to learner to indicate that a communicative act is anticipated. A sustained expectant look and posture (neck/body arched forward, shrugged shoulders, eye contact, lips pursed, eyebrows raised).	Teacher says "What do you want?" or "Tell me what you want" during morning tea. At morning tea teacher holds food object symbol board up for learner to request refreshment. Teacher looks expectantly at learner during morning tea routine waiting for request for refreshments.

<p>3. Stimulus highlighting</p>	<p>Techniques used by partners that either systematically manipulate the number of occasioning variables (not symbols themselves) available to the learner or their saliency, in order to focus learner attention on some aspect of the natural stimulus complex.</p>	<p>Comments</p> <p>Alter saliency of object or activity</p> <p>Exaggeration</p>	<p>Comments that are intended to direct attention to some aspect of the natural stimulus complex.</p> <p>Saliency of object or activity is increased to draw learner attention to it.</p> <p>Teacher exaggerates action to highlight saliency.</p>	<p>During morning tea, teacher comments "That toast smells nice!" in attempt to elicit request for toast.</p> <p>Drink is moved, placed closer or placed in direct view of learner in order to draw attention to it. Teacher taps cup to draw attention to it.</p> <p>Teacher pours juice with exaggerated action in front of learner.</p>
<p>4. Natural cues</p>	<p>Cues that are likely to occasion communication and have a high probability of being present in environment of an age-matched non-disabled peer.</p>	<p>Presence of referent</p> <p>Natural context</p> <p>Presence of partner</p>	<p>Referent is present during communicative interaction.</p> <p>Contexts are considered natural if they occur at an appropriate time of the day, appropriate setting and with appropriate partners.</p> <p>A partner is present or can be summoned.</p>	<p>Drink is on table in view of learner.</p> <p>Learner eats morning tea with peers at table at appropriate time of day.</p>

learner but the specific content of the act is not mandated. That is, the learner could potentially offer a range of different responses. Presentation of an aided augmentative communicative system may also serve the purpose of indicating to an individual that a communicative act is anticipated or required. For example, presentation of a communication board at morning tea for the learner to make a selection may serve as the cue to occasion a communicative act. This may be particularly so if access to the system is restricted to times when the partner wants to elicit a communicative behaviour. In instances where access to a communicative system is not continuous or extensive, system presentation may be a particularly salient cue for communicative acts. Access to aided communicative systems has been identified as an important variable influencing communicative spontaneity when such systems are used (Rowland & Schweigert, 1989; 1993a,b; Rowland, Schweigert, Brummett & Mills, 1991). Thus, the inclusion of system presentation at this level of the hierarchy would seem appropriate and justified.

Expectancy might be regarded as a less intrusive strategy than the other generalised communicative cues. Expectancy involves the specific use of nonverbal cues (neck/body arched forward, shrugged shoulders, eye contact, lips pursed, eyebrows raised) to indicate that a communicative response is anticipated and has been reported as quite successful in eliciting communication when used in conjunction with time delay (Halle, 1982; Halle et al., 1981; Kozleski, 1991; Schwartz, Anderson & Halle, 1989; Turnell & Carter, 1994). This is not surprising since the nonverbal behaviours described here are quite arresting and a response may be considered obligatory. In fact, expectancy could be regarded as a nonverbal request for a communicative act. Whilst expectancy may relate to the listener preparatory behaviour of securing attention (see Kaczmarek, 1990) it is certainly much more intrusive in regard to the obligation for learner response than the strategies for increasing partner saliency previously discussed within the auspices of stimulus highlighting. Teacher behaviour is a salient discriminative stimulus under expectancy. Expectancy may not necessarily focus learner attention on other appropriate contextual cues. Thus, it can be appropriately considered a form of generalised communicative cue.

The fourth level on the hierarchy (direct prompts) would probably be seen primarily within the context of an instructional program and consists of response prompts. These prompts have the specific characteristic of directly prompting the learner (as opposed to drawing attention to other relevant environmental stimuli) and specifying the content and/or form of the behaviour required. Physical guidance to form the manual sign "drink" would be an example of a direct prompt as the required response (i.e., "drink") is specified by the nature of the prompt. Direct prompts are considered the most intrusive in the current hierarchy, and thus, communicative acts in response to these prompts would be considered the least spontaneous.

The four-level hierarchy proposed here appears to overcome some of the practical problems in generating a global indicator of communicative spontaneity. The four-level hierarchy has fewer loci than Halle's (1987) continuum. However, the organisation of antecedents into broad classes of cues and prompts that have functional similarities creates the potential for less variation in spontaneity at a given point on the continuum. Further, it has the potential to provide detailed information on a substantial range of environmental variables like the matrix model of Kaczmarek (1990), but also organises variables into a framework that allows spontaneity to be estimated as a point on the scale. For example, the spontaneity of a particular communicative act could be rated at the highest level on the hierarchy in which any antecedent variable was observed. The four-level hierarchy may be regarded as a step toward the operationalisation of the continuum conceptualisation of communicative spontaneity. The hierarchy presented in Table 4 was designed to illustrate

the proposed taxonomy generally rather than provide formal operational definitions. An extended and modified version of the hierarchy has been developed and applied in a research context with adequate levels of reliability being demonstrated (Carter, 1997).

Advantages of the continuum conceptualisation

The continuum conceptualisation of spontaneity offers several material advantages over the binary conceptualisation. It offers logical consistency in terms of definition of communicative spontaneity and overcomes the arbitrariness of binary definitions. The continuum conceptualisation also appears, potentially, to offer superior explanatory power, giving insight into a greater range of stimulus variables than the binary conceptualisation. In regard to intervention, the continuum conceptualisation offers more specific direction, particularly in regard to where control should be transferred when attempting to establish more functional communication. Further, the continuum conceptualisation appears more consistent with a contemporary understanding of the complex range of variables associated with social communication.

Limitations of the continuum conceptualisation

Several specific problems and limitations of the continuum conceptualisation will now be examined. Specifically addressed will be the problems of accommodating multiple sources of control within the model, lack of normative data and potential problems associated with programming.

Multiple sources of control. Several variables may need to occur conjointly or in series to occasion a communicative act. These multiple sources of control may complicate attempts to program for communicative spontaneity (Halle, 1987; Sigafoos & Reichle, 1993) and our interpretation of spontaneity of demonstrated communication. For example, an individual may require two antecedents from different levels of a spontaneity continuum to be present before a communicative act is generated. In addition, antecedents such as establishing operations may need to have been in effect for many hours prior to a communicative act. A prior history of reinforcement in a particular situation may also impact on the probability of communicative responding. A related question is the extent to which prior controls are lost when a learner moves to a new point on the continuum (Sigafoos & Reichle, 1993). It is possible that for some individuals, progression along a spontaneity continuum may simply involve trading in one narrow controlling antecedent for another (Sigafoos & Reichle, 1993). It may be appropriate in some situations for the influence of some previous controlling stimuli to be relinquished when moving to higher points on a continuum. Alternatively, it may be appropriate for some controlling stimuli to remain operative as the learner acquires the ability to communicate in response to less intrusive cues. For example, it would be reasonable to expect that a student would continue to be able to respond to questions and mands, even when they were also able to respond to less intrusive cues. The issue of multiple sources of stimulus control has not been fully examined at this point (Sigafoos & Reichle, 1993) and Halle (1987) has suggested that we may need to "... expand our models of human behaviour to encompass the phenomenon of multiple control" (p. 35). The extent to which multiple sources of control can be accommodated within the continuum conceptualisation of spontaneity needs further research.

Normative data. The issue of the extent to which previous controlling loci on a continuum should be relinquished as the individual progresses, highlights the problems of a lack of normative data on communicative spontaneity. To what range of antecedent variables should individuals with high support needs respond and what variation is acceptable? Behaviour that is “excessively” spontaneous (i.e., it appears totally unrelated to contextual stimuli) may be regarded as deviant (Halle, 1987) or may reflect an inability to maintain appropriate interaction (Light et al., 1992; Ogletree, Wetherby & Westling, 1992). It would certainly appear possible for behaviour to be too spontaneous. One obvious complicating factor is that spontaneity would be expected to vary across contexts. For example, it would be appropriate for a soldier completing drill to demonstrate a very low level of communicative spontaneity. In fact, a high degree of spontaneity in such a situation might place the individual at considerable disadvantage. In a social situation, a much higher level of spontaneity might be appropriate. Further complicating attempts to address this question is the issue of an appropriate normative group (Halle, 1987). To whom should individuals with high support needs be compared when determining socially valid ranges for communicative spontaneity? Clearly, normative information on variables that occasion communication for individuals without disabilities, across a wide range of contexts, would be of considerable interest and value. The present lack of such data is likely to greatly complicate the study of communicative spontaneity in individuals with high support needs using a continuum conceptualisation.

Programming. A number of questions may be identified regarding the continuum model in relation to the design of possible intervention strategies. Halle (1987) offered reservations regarding the use of a continuum for programming purposes that have general relevance. Specifically, it has been questioned whether learners would need to move through a continuum in a sequential manner. In particular, Halle (1987) has pointed out that some points on a continuum may be bypassed completely in instruction and that movement along a continuum (i.e., establishing narrow stimulus control that is expanded) may not be the only way of developing spontaneity. Both loose training (Stokes & Baer, 1977) and general case instruction (Horner & McDonnald, 1982; Horner, McDonnell & Bellamy, 1986; Horner, Sprague & Wilcox, 1982) were offered as examples of strategies that establish broad stimulus control from the outset of instruction. The primary intent of these procedures is to develop generalisation rather than spontaneity (Halle, 1987) but the issues of generalisation, spontaneity and motivation are interrelated (see Chadsey-Rusch, Drasgow, Reinoehl, Halle & Collet-Klingenberg, 1993). It is possible that generalisation strategies could have application to developing spontaneous behaviour. For example, Chadsey-Rusch et al. (1993) have demonstrated that general case instruction could be used to facilitate generalisation of unprompted requests for help. It is also plausible that in applying general case instruction, points along the spontaneity continuum may be treated as variations in relevant stimulus dimensions that need to be incorporated into instruction. Kaczmarek (1990) has suggested the use of a matrix incorporating variables of interest (e.g., listener preparatory behaviours and the presence and proximity of objects or events). It is also suggested that stepwise progression through such a matrix may facilitate the development of spontaneity and obviate the necessity of training every possible step.

It would certainly appear that there are several possible options to sequential progression along a defined spontaneity continuum in establishing spontaneity of communication. However, these options should be seen as variations in the way that the continuum may be used as opposed to detracting from the conceptualisation. A continuum simply defines a

range of loci in order of spontaneity, but it does not stipulate how these loci should be used in instruction.

Conclusion

Two conceptual models of communicative spontaneity have been presented in this paper. It is argued that while the binary model is most commonly employed in research, it provides very limited information on the circumstances in which communication occurs, and consequently, limited information on spontaneity. Despite some limitations, the continuum model offers potential for a greater understanding of spontaneity, which may lead to more effective approaches to intervention. Several taxonomies exist to assist in the operationalisation of the continuum model. It has been argued that an approach that categorises antecedent events into broad classes has the greatest potential to capture the complexity of antecedent events and also allows a numerical summary of the level of spontaneity of a particular communicative act.

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