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Development of Body Part Vocabulary in Toddlers in Relation to Self-Understanding

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Abstract

To better understand young children's ability to communicate about their bodies, toddlers' comprehension and production of 27 common body part words was assessed using parental report at 20 and 30 months ($n = 64$), and self-awareness was assessed using mirror self-recognition. Children at both ages comprehended more body part words that referred to themselves than to others' bodies, and more words referring to locations that they could see on themselves than to those they could not see. Children with more advanced mirror self-recognition comprehended and produced more body part words. These findings suggest that with age and better understanding of the self, children also possess a better understanding of the body, and they provide new information about factors that affect how young children begin to talk about their own and others' bodies. They should be useful for practitioners who need to ask children about their bodies and body parts.

Keywords

body knowledge; vocabulary; toddlers; self-understanding; comprehension; production

Vocabulary development significantly expands infants' interactions with others and their ability to make their own intentions and needs known. In particular, use of body part words enhances children's ability to communicate about themselves and others. Although medical and forensic professionals often rely on children's understanding and use of such words in their assessments, remarkably little research has addressed the early development of children's body part vocabulary. Knowing when and how children begin to master this key aspect of vocabulary can provide clinical specialists with insights into how very young children understand and think about themselves and others; can assist in identifying delays or deficiencies; can inform medical and forensic interviews that involve asking children about their own bodies; and can contribute to language-focused interventions for children

with impairments in comprehension or production. The purpose of the current study is to add to our understanding of early developments in children's body part vocabulary by studying toddlers, and to introduce an alternative methodology, i.e., parent report, for quickly assessing early body part understanding and language.

Beginning in infancy, children explore and represent their own bodies and body parts. Major developments in body perception and understanding occur in the second year of life. By 15–18 months of age infants can visually discriminate scrambled body forms from typical body forms and by 24 months they can reliably categorize these differences (Heron & Slaughter, 2008; Slaughter & Heron, 2004). Twenty-four-month olds also have a working knowledge of the size and shape of their own body, and by 30 months they are beginning to represent how body parts are spatially arranged for both their own and others' bodies (Brownell, Nichols, Svetlova, Zerwas, & Ramani, 2010; Brownell, Zerwas, & Ramani, 2007; Heron & Slaughter, 2008).

During this period, as children are developing basic spatial and configural understanding of bodies, they are also developing a body part vocabulary. In one of the few systematic studies of body-part vocabulary comprehension with very young children, Witt et al. (1990) tested receptive vocabulary by asking 11 – 25 month old toddlers to point to 20 body parts on a doll. The authors found that 12-month olds understood less than one body-part word on average, which increased to nine words by 18 months of age, and thirteen words by 24 months. Twelvemonth-olds first understood words for eyes, nose, mouth or hair, all body parts associated with the head, over other body parts such as arm, leg, or back, which were understood much later. Interestingly, children's earliest learned verbs are also body-part specific, progressing from production of mouth-related (e.g., kiss, bite) and leg-related actions (e.g., climb, kick) at 21 months of age, to hand- or arm-related acts (e.g., hug, tickle) between 22 and 27 months (Maouene, Sethuraman, Laakso, & Maouene, 2011). As with language acquisition more generally, comprehension of body part words precedes the ability to produce them (Camões-Costa, Erjavec, & Horne, 2011) and body part vocabulary becomes both larger and more differentiated over the preschool years (Bayley, 1969; Cratty, 1969; Gesell, 1940; MacWhinney, Cermak, & Fisher, 1987; Witt, Cermak, & Coster, 1990).

However, our picture of children's earliest abilities to understand and name particular parts of the body remains incomplete. This is, in part, because studies of young children have typically been conducted in laboratory settings with unfamiliar examiners, potentially reducing performance because of stranger anxiety and the unique demands and distractions of an unfamiliar context. Previous estimates of early competence have also been restricted to a single session in a single setting, providing a limited perspective on nascent abilities. Further, toddlers in previous studies have been asked to point to a body part on someone else or on a doll when named by an examiner, rather than indicating it on themselves. Yet parent-child routines and nursery school games with infants and toddlers more often involve pointing to or designating the child's *own* body parts ("where's your nose?" "show me your belly-button"). Additionally, as some investigators have noted, it is often difficult to motivate very young children to pay attention in pointing tasks, and they are frequently reluctant to perform upon request. As a result, numerous trials have usually been required (up to 50), potentially introducing fatigue effects, especially for the youngest children

(Camões-Costa et al., 2011; Witt et al., 1990). Some investigators have further suggested that children's varying interest in dolls may govern their responding and introduce unknown amounts of error (Cratty, 1969; MacWhinney et al., 1987). Finally, and perhaps most important, children younger than three years of age do not yet understand a doll as a precise symbol of a person and are poor at marking correspondences between body parts on themselves and on a doll (DeLoache & Marzolf, 1995; Poole, Bruck, & Pipe, 2011). Our knowledge of children's early body part understanding and vocabulary thus remains limited in several ways. Estimates of comprehension may be too low, constrained by the factors noted above. We also do not know whether children learn words for their own body parts at the same time as those for others' bodies, or whether one precedes the other; how comprehension and production of body part vocabulary are related early in development; or whether some body part words might be understood earlier than others (e.g., for visible body areas). Finally, it is unknown how the blossoming of reflective self-awareness in the second year of life might be related to toddlers' emerging ability to talk about their own bodies.

To circumvent the concerns raised above, parent reports of toddlers' body part words were used in the current study. Parental report has become the gold standard for assessing the earliest steps in vocabulary development (Fenson et al., 2000), but it has not been previously used to study the early stages of body part vocabulary. Because parents are privy to children's competence across contexts and over time, they can provide a broader estimate of young children's vocabulary than can one-time estimates based on laboratory pointing tasks (Fenson et al., 1994). In the current study, parents were asked to report body part words that their toddlers understood using any appropriate behavioral response, not just pointing. For example, if the parent asked "where is your mouth" and the child opened and closed his mouth, this would be considered a correct response. Because comprehension can be difficult to elicit and observe in the laboratory, this approach can add new and important information about early body word understanding.

In addition, parents reported on the body parts children understood on themselves as well as on others, thereby permitting a direct comparison of young children's knowledge of their own body parts with their knowledge of others' body parts. During toddlerhood, when self-other representation is undergoing a major transition (Moore, 2007), knowledge of one's own and others' bodies may not yet be fully integrated (Brownell, Svetlova, & Nichols, 2012). Although infants do overhear others talking about bodies (e.g., "my head hurts"), recent research suggests that infants identify body part words in continuous speech by linking words with caregiver touches of the infant's body during interaction (Seidl, Tincoff, Baker, & Cristia, 2014). Moreover, children's own body parts are the focus of many salient everyday interactions and routines such as dressing ("arms up!"), bathing ("give me your face"), eating ("open your mouth"), and sleeping ("close your eyes"), as well as nursery games ("Head, shoulders, knees, & toes"), in addition to being touched during social interaction. Thus, we expect the earliest understanding of body part words to be greater for references to the child's own body parts compared to references to the body parts of others.

Production lags comprehension in vocabulary development, but we do not yet have a solid estimate of toddlers' comprehension and production of body part vocabulary or how these are related during acquisition. Only one previous study has examined both comprehension

and production of body part words in young children, and the children in that study were nearly 3 years old on average (Camões-Costa et al., 2011), well past the early stages of vocabulary acquisition and body understanding. Thus, in the current study parents were asked to report the body part words that their 20- and 30-month old children could understand and those they could produce.

The current study also examined whether a body part's visibility to the child on his or her own body affects when it emerges in the vocabulary. Although toddlers are beginning to understand their own size and shape, and how their bodies are spatially organized, their own-body representations are still nascent, and they do not yet possess a coherent, integrated map of their body parts in relation to one another (Brownell, et al., 2007; 2010). For example, when toddlers were asked to locate particular body parts on themselves by placing a sticker on an unnamed body location after watching an adult place a sticker at that location on herself (e.g., elbow; knee), 20-month-old children could accurately locate only two or three body parts on themselves, and 30-month olds, although better, could locate just four or five (Brownell, Nichols, Svetlova, Zerwas & Ramani, 2010). This is despite the fact that children begin imitating motor actions in infancy (Jones & Yoshida, 2012), suggesting a distinction between implicit and explicit self-representations. Because toddlers' explicit representations of their own bodies are still rudimentary, it seems plausible that their early body part vocabulary would be more advanced for body parts that they could see on themselves than for those they could not.

The current study additionally examined an important potential contributor to young children's emerging body part vocabulary, their developing self-other understanding. As children gain a richer knowledge of their own bodies and a vocabulary to describe the physical self during the second year, they also begin to develop objective self-awareness and a primitive self-concept (Lewis, Sullivan, Stanger, & Weiss, 1989). This means that they can represent the self explicitly, as an object of reflection and reference. This new ability to reflect on themselves should enhance young children's attention to their own bodies and their acquisition of body part words. Indeed, Brownell et al. (2010) found that 20- and 30-month olds' understanding of the spatial characteristics of their bodies, such as size and spatial configuration, was related to self-recognition and self-awareness. Thus, children who were better able to reflect on themselves possessed a greater understanding of the topography of their bodies. In the current study we test the hypothesis that children who self-recognize (more advanced self-other understanding) will have larger body word vocabularies, independent of age.

In sum, the current study had four aims: 1) to expand our understanding of early developments in toddlers' comprehension and production of body part words by using parental report to add to previous findings from laboratory measures; 2) to compare toddlers' body part vocabulary at two ages to determine age related differences in body word knowledge; 3) to examine early body part vocabulary as a function of whether words refer to the child's own body or another's body, as well as whether words refer to body parts that are visible to the child from her own perspective on her own body or not; 4) to determine whether advances in self-awareness are related to advances in body part vocabulary.

Method

Participants

Sixty-four typically developing toddlers between 19 and 31 months of age and their parents were recruited from a medium sized city to participate in a larger study on the development of body understanding. Families were recruited by mail and phone from a database of parents of young children who agreed shortly after the child's birth to be included with their child in a regional research registry. All participants who enrolled in the study completed it. The final sample consisted of thirty three 20-month olds ($M = 20.45$ months; $SD = 1.03$) and thirty one 30-month olds ($M = 29.58$ months; $SD = 1.06$) approximately evenly distributed between boys and girls. Participants were predominantly middle class and Caucasian (78% Caucasian, 8% biracial, 7% Asian, 2% African American, 5% did not report race). Parents were screened over the phone prior to study enrollment and children with reported developmental delays, prolonged illness or hospitalization, or who did not speak English as their primary language were not invited to participate in the study.

Procedures and measures

The study took place in a playroom furnished with age-appropriate toys and a one-way mirror across one end through which the session was videotaped. A parent remained with the child at all times, seated in a nearby chair completing questionnaires while the child played with the experimenter and completed the self-recognition task. Parents were not told the goals of the study.

Children's comprehension and production of body part words were assessed using a parent-completed checklist of 27 common body part words adapted from previous research (MacWhinney et al., 1987; Witt et al., 1990). Some words were included that children this age were not expected to know (e.g., 'nape') to prevent ceiling effects, and some that were suggested during pilot testing when parents spontaneously wrote in body words their child comprehended and/or produced (e.g., 'forehead'). Parents indicated which words their child could understand (*comprehension*) on themselves (e.g. "where's your nose") &/or on another ("where's Mommy's nose"). They also indicated which body parts their child could name (*production*) without distinguishing whether the name referred to the child's body or to someone else's. Parents were instructed to answer only for words they were sure their child could understand or say. Parents completed the questionnaire while the child participated in other behavioral tasks, reporting children's body part vocabulary from personal experience rather than overtly testing children's knowledge. The parent-report instrument is provided in the appendix (Cronbach's alpha = .945 for total scale).

Children were scored for the total number of part body words comprehended on self (0 – 27), comprehended on others (0 – 27), and produced (0 – 27; no distinction between self and others). Separate scores for comprehension of visible (e.g., hand, foot, knee; 0 – 24) and non-visible (e.g., nose, mouth, back; 0 – 30) body parts were calculated, summing over self and other body parts for each one. Visible body parts were those visible to the child from the child's own perspective on his/her own body, whereas non-visible body parts were not visible to the child from the child's own perspective on his/her own body. Separate scores

for production of visible (0–12) and non-visible body part words (0–15) were also calculated.

Self-awareness was behaviorally assessed with the standard mirror self-recognition “rouge” task, widely used with children between 12 and 30 months of age (e.g., Amsterdam, 1972; Nielsen, Dissanayake, & Kashima, 2003). While the child was busy playing, a parent surreptitiously placed a dot of lipstick on the child’s nose while pretending to wipe it. Children were then placed in front of a mirror and the experimenter drew the child’s attention to the image in the mirror. Video records of the session were coded for children’s responses to their mirror image and the mark on their face. Per established procedures in the literature, children were scored as passing if they touched their own nose or if they said their own name while looking in the mirror; all other behaviors were considered failures (e.g., touch some other part of the body; kiss the image; try to find the baby behind the mirror). A graduate and undergraduate student completed the coding with a Kappa of .88 for inter-rater reliability. Disagreements were resolved through consensus. Fifteen of the younger children passed (50%) while 15 failed, and 23 of the older children passed (79%) while 6 failed.

Results

The proportions of children who comprehended and produced each body part word at each age are shown in Tables 1a and 1b. According to parent report, eleven body part words were produced by 25% or more of 20-month-olds and twenty words were produced by 25% or more of 30-month olds. Twenty-month olds could name six body parts, on average, which nearly doubled by 30 months (Table 2).

Preliminary analyses showed no effects for child gender on total comprehension or total production of body part words, thus gender was not further considered. Because there were more non-visible than visible body part words in the checklist, proportions were used in the substantive analyses. Overall, children were able to comprehend proportionally more body part words ($M = .64$; $SD = .17$) than they were able to produce ($M = .31$; $SD = .30$), $t(63) = 9.41$, $p < .001$. Body part comprehension was correlated with body part production even after controlling for age ($r = .33$, $p < .01$; *partial* $r = .25$, $p = .05$).

Body part vocabulary as a function of age, location, and visibility

The average number of words comprehended and produced at each age is shown in Table 2, broken down for body words referring to self vs. other and to visible vs. non-visible locations. Separate analyses were conducted for comprehension and production scores because words for body parts referring to self vs. other were only distinguished for comprehension. Words for visible and non-visible body parts, on the other hand, were distinguished for both comprehension and production.

For children’s comprehension of body part words, a mixed model ANOVA was conducted, with age (20 months; 30 months) as the between subjects factor, and body part location (self vs. other) and body part visibility (visible vs. non-visible) as within-subjects factors. There was a significant main effect for age, $F(1, 62) = 22.88$, $p < .001$, $\eta^2 = .27$. Older children understood proportionally more words ($M = .73$, $SD = .11$) than younger children ($M = .56$,

$SD = .16$). There was also a significant main effect for body part location, $F(1, 62) = 10.51$, $p = .002$, $\eta^2 = .15$. Children comprehended proportionally more body part words that referred to their own bodies ($M = .63$, $SD = .20$) than words referring to another's body ($M = .58$, $SD = .22$). There was a significant main effect for body part visibility as well, $F(1, 62) = 8.96$, $p = .004$, $\eta^2 = .13$. Children comprehended more words for body parts visible to them from their own perspective ($M = .63$, $SD = .20$) than for body parts not visible ($M = .59$, $SD = .18$). There were no significant interactions.

A second mixed model ANOVA was conducted on children's production of body part words, with age as the between subjects factor and body part visibility as the within subjects factor. There was a marginal main effect for age $F(1, 62) = 3.70$, $p = .059$, $\eta^2 = .056$ such that older children produced proportionally more words ($M = .38$; $SD = .35$) than younger children ($M = .23$; $SD = .22$). There was no effect for visibility nor was the interaction significant.

Body part vocabulary and mirror self-recognition

To determine whether body part vocabulary differed as a function of self-awareness, separate one-way ANCOVAs were conducted on the total scores for comprehension and production of body part words, with the mirror self-recognition score (pass vs. fail) as the independent variable, controlling for age. Children who passed the mirror self-recognition task comprehended proportionally more body part words ($M = .70$; $SD = .13$) than children who failed ($M = .55$; $SD = .19$), $F(1, 56) = 6.76$, $p = .012$, $\eta^2 = .108$. Additionally, children who passed the mirror self-recognition task produced proportionally more body part words ($M = .38$; $SD = .31$) than children who failed ($M = .17$; $SD = .22$), $F(1, 56) = 5.03$, $p = .029$, $\eta^2 = .082$.

Discussion

The findings from the current study add new knowledge to the small but important corpus of work on the earliest developments in children's body-part vocabulary. Using parent report, we have found that 20- and 30-month old toddlers understand more body-part words than reported previously by studies using laboratory measures of body part knowledge. We have further discovered that toddlers comprehend words that refer to their own body parts better than they comprehend words referring to others' bodies, and better comprehend words that refer to body parts that they can see on themselves than body parts they cannot see. We have also found that the early ability to comprehend and to name specific body parts develop in concert with the emergence of objective self-awareness.

This is one of only a handful of studies to examine the development of body part vocabulary in toddlers, and the only one to use parent report. Parent report is the current gold standard for measuring the early stages of vocabulary development (Fenson et al., 2000). Here, it permitted us to assess children's understanding and production of body part words across multiple settings and time points rather than at one time point in the single setting of the laboratory as has been the case for previous research. Additionally, the motivational, attentional, and linguistic demands of laboratory tasks in which an unfamiliar experimenter asks children to point to body parts on themselves, dolls, or other unfamiliar adults were

eliminated. It also permitted us to distinguish between comprehension and production abilities in children's early body part vocabulary, and to distinguish between words that refer to the child's own body versus words referring to some else's body.

The findings from the current study both converge with previous laboratory-based findings and add new insights. Consistent with previous studies, significant age differences emerged and children tended to comprehend and produce words related to the head and face (e.g., eyes, nose, mouth, hair) earlier than words for limbs and limb parts (e.g., arm, leg, fingers, toes, knee; see tables 1a and 1b). However, the specific age-related patterns differed for comprehension and production of body part words, for whether body parts referred to the child's own or another's body, and for whether a body part was visible to the child on his or her own body. As discussed more fully below, these findings extend our understanding of how children begin to represent their own and others' bodies and their ability to talk about bodies, and they expand current methodologies for assessing early body part vocabulary.

Early Developments in of Body Part Vocabulary

Like the small extant literature on the development of early body part vocabulary we found that 30-month-olds understood more body part words than did 20-month-olds. However, our findings, based on parent report, suggest greater competence than indicated by previous studies. For example, Gesell (1940) reported that most 18-month-olds could not point to even a single body part on themselves upon examiner request. Bayley (1969) reported that 19-month olds could comprehend three words on average when asked by an examiner to point to specific locations on a doll; and Witt, et al (1990) found that 18-month-olds could point accurately to nine body parts on a doll when asked by an examiner. In contrast, parents in the current study reported that 20-month-old children understood fifteen body part words on average (older children understood 20), a rate greater than reported in any prior studies and not accomplished by children in Witt's study until 24 months of age. At least 25% of the younger children in the current study understood twelve words. Moreover, parents in the current study reported that even the youngest children understood several words for locations outside of the head and face, such as tummy, hand, and foot, unlike the findings of previous studies. Although parents could have over-reported their children's competence, it is equally likely that previous laboratory-based tasks which relied on the use of dolls, required toddlers to point, and required many trials, may have under-estimated early competence. One goal for future research will be to compare laboratory methods with parental report for assessing body word knowledge in the same children.

Interestingly, despite the fact that all body parts on others' bodies are visible to children, early comprehension of body-part words appears to be constrained by what they can see on their own bodies. Children at both ages comprehended significantly more body-part words that they could see on themselves from their own perspective (e.g., hand) than words referring to non-visible body parts (e.g., back). Perhaps this is because children's own visible body parts are more salient and more consistently within attentional focus. This may provide more opportunity for exploration, interaction, and labeling by others than non-visible body parts which are often out of children's own reach in addition to being out of their sight. Research on general vocabulary comprehension has shown that infants rely on

perceptual salience when mapping novel words to objects (Pruden, Hirsh-Pasek, Golinkoff, & Hennon, 2006; Woodward & Hoyne, 1999). As toddlers have yet to develop internalized body maps (Brownell et al., 2007; 2010) it is difficult for them to produce mental images of the parts of their own body that they cannot view. This makes it more challenging to learn connections between those body parts and the corresponding words. Some face parts are exceptions, probably because parents frequently comment and act on them, for example wiping noses and mouths or asking children to close their eyes, thereby making them salient through others' touch and physical manipulation within the context of social and communicative interaction. In contrast to comprehension, there was no effect of visibility on production of body part words. This was likely because children at these ages produced relatively few body part words, many fewer than they could comprehend, and possibly too few to detect an effect. However, the results could also indicate that different factors influence production of body part words than comprehension.

In addition to being affected by body part visibility, children were better at comprehending body-part words when the words referred to themselves (e.g., Sally's nose) than when they referred to others' bodies (e.g., Mommy's nose). Children have greater access to information about their own bodies through self-exploration and developing self-knowledge (Rochat & Striano, 2000). In addition, parents tend to engage their children in scaffolding and learning opportunities referencing the child's own body (e.g., "Let's brush your hair," "Where is your tummy?" "Your hands aren't for hitting") thus providing greater exposure to and practice with body words referring to the self. Furthermore, research suggests that distinct brain regions in adults underlie the ability to detect and distinguish one's own body from another's (Devue et al., 2007; Hodzic, Muckli, Singer, & Stirn, 2009), raising the possibility that different developmental perceptual and learning experiences give rise to each region. It would be informative to extend the current study by observing how often parents label, refer to, comment on, or point out specific body parts on children's own bodies during everyday interactions in comparison to talking about the bodies of others. Regardless of the underlying mechanism, it is important for practitioners to know that very young children are more likely to comprehend body talk about their own bodies than about others' bodies, even when the very same words are used. Thus, phrasing dialogue about bodies in reference to the child's own bodies rather than in reference to other's bodies (such as a doll, parent, photographs, etc.) will make it more likely that younger children will comprehend the information being conveyed.

Parent reports permit comparison of children's comprehension and production of body part words which previous studies with toddlers have not been able to do, as most measured comprehension or production, and not both. As with broader vocabulary, vocabulary production lagged behind vocabulary comprehension (Benedict, 1979; Goldin-Meadow, Seligman, & Gelman, 1976). However, the current results show that even very young, just-verbal children have the wherewithal both to name selected body parts and to comprehend them when someone else names them. Children at both ages who understood more body part words also named more body parts. Thus, while production lags behind comprehension, the two abilities follow similar trajectories.

Body Word Vocabulary and Self-Understanding

Because the body serves as the physical representation of the self and a visual boundary between self and other, it was expected that during this period of rapid advances in self-other understanding (Moore, Mealiea, Garon, & Povinelli, 2007) children's ability to represent and refer to body parts would develop in concert with the emergence of objective self-awareness. Results indicated a positive relationship between both comprehension and production of body part words and mirror self-recognition, an embodied form of objective self-awareness and the first step in self-concept development (Lewis et al., 1989). The emerging ability to represent the self objectively may permit children to understand references to body parts and refer to bodies themselves.

This association provides a useful preliminary marker of the concurrent validity of parent report of their young children's body part vocabulary. Just as important, it may reflect a shared developmental mechanism, that is, the ability to mentally represent and explicitly compare first-person perceptual information about self and third-person perceptual information about others (Moore, 2007). This enables children to link a mental representation of the body to sensory information about self, be it the visual image of the self in the mirror (Zwicker, Moore, & Povinelli, 2012) or the auditory information provided by a body word. At the same time as advances in objective self-awareness help children understand their own body as a unique object, they may become more interested in their body parts and inclined to represent the body explicitly in words, increasingly able to connect body part labels to the particular body parts they represent. Developments in the ability to refer to themselves and their bodies then allows young children to engage others in discourse about their bodies, further distinguishing self from others and adding to their growing understanding of and discussions about their own bodies. Thus, early in development, growth in self-other understanding and in body part talk may relate to one another bidirectionally.

Limitations

While the current study provides new insights regarding the early development of body word understanding and production, the findings must be considered in light of certain limitations. First, the sample was middle class and relatively well educated, thus the children may have had larger vocabularies, including body part words, than children from less privileged backgrounds and although other patterns in the data would be expected to remain. Moreover, the parents were willing to participate in developmental research and were able to come to the laboratory during work hours, making the sample additionally select (although similar to many samples in developmental laboratory research). Finally, parental reports can be biased as parents may misremember or misreport their children's abilities. However, a decided advantage from the perspective of the current study is that questionnaires allow parents to reflect upon many interactions with their children across time and settings, which is not possible in laboratory tasks. Parent questionnaires can also be of particular utility for practitioners such as teachers, lawyers, or doctors because they are relatively quick and easy to use. Nevertheless, the findings need to be replicated and extended to other samples, and it will be important to compare parent reports to other measures of children's body part knowledge.

Conclusions

For professionals who rely on children's ability to communicate about their own bodies, whether reporting where pain is located or where touch may have occurred, the current findings for comprehension and production of body part words in very young children are instructive. The results show that by 18 – 20 months of age, most toddlers can understand some body part words, especially those that refer to facial features, stomach, hand, and foot; but fewer are likely to understand references to more specific limb parts such as fingers and toes until a year later. Second, toddlers will be more capable of responding to queries that are grounded in comprehension ("show me") rather than questions that ask them to produce a body part word or label ("tell me"). Third, queries or suggestions that ask children to indicate body parts that are especially salient to them will be better understood, including words that refer to locations on themselves rather than on another, and words that refer to body parts that the child can see on their own bodies from their own first-person perspective. Finally, asking parents to report on their children's vocabulary, now a standard procedure for general vocabulary comprehension and production (Fenson, et al, 1994; 2000), also proves to be useful for assessing body part vocabulary in very young, just-talking children.

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Appendix A. TODDLERS' BODY PART KNOWLEDGE

Which of the following body parts does your child understand on *him/herself* (“where’s your nose?”) or on *you* (“where’s Mommy’s nose?”). Please check each one of the following that you’re sure of. If your child has a word that he or she routinely says for a given body part, check the appropriate space in the third column.

Body Part	<u>On Child</u> (Where's your X?)	<u>On Mom/Dad/Sib</u> (Where's Mommy's X?)	<u>Can Child Name This?</u> (If child's word is different, please note child's word)
Nose			
Hand			
Foot			
Hair			
Head			
Ear			
Tummy			
Leg			
Arm			
Back			
Neck			
Forehead			
Wrist			
Elbow			
Calf			
Temple			
Nape			
Cheek			
Chin			
Ankle			
Knee			
Underarm			
Shoulder			
Fingers			
Toes			
Eyes			
Mouth/lips			

Table 1A

Percent of children at 20 months (out of 33 children) who comprehended & produced each of the 27 body part words

<i>Body Part</i>	Comprehension	Production
	<i>Percentage of Children</i>	<i>Percentage of Children</i>
Nose	100%	70%
Mouth/Lips	97%	58%
Hair	97%	36%
Tummy	94%	49%
Ear	94%	46%
Eye	94%	61%
Hand	94%	46%
Foot	94%	46%
Head	91%	33%
Toes	88%	52%
Fingers	79%	24%
Leg	79%	15%
Arm	76%	12%
Knee	64%	27%
Cheek	49%	12%
Chin	46%	15%
Back	42%	9%
Neck	39%	12%
Shoulder	24%	3%
Forehead	21%	6%
Elbow	18%	12%
Underarm	9%	0%
Wrist	6%	0%
Ankle	6%	3%
Nape	3%	0%
Temple	3%	0%
Calf	0%	0%

Table 1B

Percent of children at 30 months (out of 31 children) who comprehended & produced each of the 27 body part words

<i>Body Part</i>	Comprehension	Production
	<i>Percentage of Children</i>	<i>Percentage of Children</i>
Nose	100%	55%
Mouth/Lips	100%	52%
Hair	100%	52%
Tummy	97%	65%
Ear	97%	48%
Eye	100%	52%
Hand	100%	55%
Foot	100%	52%
Head	97%	55%
Toes	90%	52%
Finger	100%	45%
Leg	100%	48%
Arm	100%	48%
Knee	97%	52%
Cheek	97%	45%
Chin	87%	48%
Back	84%	39%
Neck	81%	39%
Shoulder	55%	29%
Forehead	48%	19%
Elbow	61%	29%
Underarm	24%	16%
Wrist	32%	10%
Ankle	39%	16%
Nape	0%	0%
Temple	0%	0%
Calf	7%	0%

Table 2

Mean number of words comprehended and produced by age, location (self/other) and visibility (visible/non-visible).

Comprehension (Number of Words Comprehended)		
	20 Months M (SD)	30 Months M (SD)
Self (27 words)	14.91 (4.43)	19.87 (3.06)
Other (27 words)	13.27(4.86)	19.59 (3.16)
Visible (24 words)	12.94 (4.68)	18.17 (2.78)
Non-Visible (30 words)	15.24 (4.84)	21.24 (3.92)

Production (Number of Words Produced)		
	20 Months M (SD)	30 Months M (SD)
Visible (12 words)	2.85 (2.98)	5.03 (4.31)
Non-Visible (15 words)	3.61 (3.07)	5.86 (5.21)
Total (27 words)	6.45 (5.83)	10.9 (9.43)