

Recording communication in primary dental practice: an exploratory study of interactions between dental health professionals, children and parents.

Siyang Yuan¹

Gerry Humphris²

Alastair Ross³

Lorna MacPherson³

Ruth Freeman^{1,4}

1. Dental Health Services Research Unit, University of Dundee, DD1 4HN
2. Health Psychology, School of Medicine, University of St Andrews
3. Dental Public Health, University of Glasgow
4. Dental Public Health, NHS Tayside

Name and address for correspondence:

Dr S Yuan, Dental Health Services Research Unit, School of Dentistry, University of Dundee, Park Place, Dundee, DD1 4HN

ABSTRACT:**AIM:**

To explore the time taken and the types of communication strategies used by dental health professionals (DHPs) when interacting and providing fluoride varnish and oral health advice to children with their parents.

METHODS:

A video observational study was conducted to explore the types of communication strategies used by DHPs when interacting with child patients and their parents during a preventive oral health care appointments. Three dentists and two Extended Duty Dental Nurses (EDDNs) from four general dental practices were recruited in East of Scotland. Forty-four child-parent dyads participated in the study. Verbal and non-verbal behaviours were coded with Observer XT 10.5 using the PaeD-TrICS coding scheme. Frequencies of communication behaviours were compared using Mann-Whitney U tests.

RESULTS:

The communication during the preventive care appointment ranged in time from 130 seconds to 1,756 seconds with an average of 736 seconds. The total number of communication strategies (verbal and non-verbal behaviours) based on 44 video observations was 7,299. DHPs used different communication strategies when providing fluoride varnish and oral health advice. Dentists used more direct communication strategies to elicit child patients' cooperation in FV application. EDDNs used communication behaviours to maintain a balanced relationship with children. Consequently, children were shown exhibiting different responses to the two different dental professional groups.

CONCLUSIONS:

Differences in the style of communication strategies existed between the participating DHPs when interacting with children during preventive dental appointment. Further work is required to confirm these initial findings.

INTRODUCTION

Communicating with young children in the primary dental care (PDC) setting is particularly challenging for dental health professionals (DHPs). Reasons for these difficulties are said to include time pressures in general practice, child dental anxiety and associated behavioural management problems and parental concerns [1-3]. These difficulties are associated with young children's phase of their psychological development, their level of understanding and cognitions together with their language. Taken in conjunction, with child dental anxiety and the potential for regression, these developmental factors may intrude upon the child's capabilities to interact with the DHPs.

Consultations involving child patients are usually conducted with an accompanying parent and if the parent is overly anxious for the child's welfare or experience dental anxiety themselves, this may increase the complexity of communication strategies required to care for both child and parent. Hence, to enable a treatment alliance to occur and for treatment to begin, DHPs will require special communication styles when engaging with young children and their parents. The communication styles adopted by the DHPs will permit a special form of interaction to develop known as the triadic interaction which gives rise to the treatment alliance.

There is little available evidence with regard to understanding the triadic interaction and what type of communication strategies are used by DHPs when interacting with children and their parents in the primary care setting [4]. With an understanding of the communication strategies of different DHPs, it would be possible to strengthen the treatment alliance and assist DHPs to provide quality and effective preventive oral health care to maintain children's dental health. Nevertheless, the question remains what types of communication strategies do DHPs use in primary dental care? Therefore, there is a need to explore the types of communication used by DHPs when providing fluoride varnish and oral health

advice to the child patient and their accompanying parent, using the reliable and valid video observational study protocol. The aim of the study was to explore the time taken and the types of communication strategies used by dental health professionals (DHPs) when interacting and providing fluoride varnish and oral health advice to children with their parents.

METHOD

Study design

A cross-sectional observational study of preventive care appointments in the primary dental care setting was conducted using video recordings.

Sample

Purposive sampling was used to identify participants who had the specific characteristics of a population of children and parents who attend for fluoride varnish application in primary dental care and the dental health professionals (dentists and extended duty dental nurses) who apply the fluoride varnish. Therefore, using this sampling approach, parent and their children and the dental health professionals who fulfilled the inclusion criteria were invited to participate [5].

A purposive sample of 5 DHPs with various levels of clinical experience from 4 GDPs in East of Scotland were invited to participate and took part in the study. The Scottish Index for Multiple Deprivation (SIMD) for the participating GDPs was assessed, their clinical experience as the number of years in practice since qualification and gender were obtained. Fifty child-parent pairs were recruited from the four participating GDPs. The inclusion criteria for child patients were those who could speak English and aged 2-5 years with no developmental impairment. Of these, 6 observations were excluded for further video data analysis, due to: (a) two pairs of twins were treated with their twin siblings; (b) one child was the sibling of another

participating child and was invited by the parent to receive FVA during the video observation;
(c) one child was excluded due to learning difficulties.

Development of Paediatric Dental Triadic Interaction Coding Scheme (PaeD-TrICS)

A number of attempts have been reported to develop behavioural coding systems for child and dental health professionals [6, 7, 8]. The Paediatric Dental Triadic Coding Scheme was developed to catalogue define the triadic interaction between dental professionals, parents and children in terms of verbal and non-verbal behaviours in a clinical setting. The majority of the coding items were drawn from the St Andrews Behaviour Interaction Coding Scheme (SABICS), which was developed for EDDNs and child behaviours observed during the fluoride varnish application (FVA) in a nursery setting [6].

This new coding scheme consisted of 45 verbal and non-verbal behaviours exhibited by one of the three participants: i.e. DHP, parent or child (Figure 1). Additional codes were assigned to new behaviours observed during the dental consultations in this study and included in the new coding scheme. These comprised of the DHPs' strategies used commonly in managing children's anxiety, such as 'TSD (tell-show-do) talk', 'reassurance', 'offer for alternative task' and those for encouraging child cooperative behaviours such as 'praise', 'reward (stickers)' and 'dentally engaging talk'. Children's communication behaviours included their verbal behaviours such as 'speech yes', 'speech no', 'speech other', 'dental talk', 'laugh' and 'cry'. The reliability of inter-examiner observation was assessed (inter-class correlation coefficient) and found to be acceptable [9].

Data collection

Video recordings were collected when child patients with accompanying parents visited GDPs for preventive care appointments. The video recordings allowed direct observations of DHPs' communication strategies when interacting and providing preventive dental care (i.e. oral health advice and fluoride varnish application) to child patients with their parents.

Children's demographic information, previous dental experiences and their appointment related information (e.g. accompanying family members at the appointment) were collected. Children's age, gender and previous experience of FVA were obtained. These variables allowed the homogeneity of the patient group to be assessed.

Statistical Analysis

Video recordings were uploaded onto Observer XT 10.5 and coded [10]. Chi-square tests were applied to ensure the demographic characteristics and past FVA experiences of the children treated by different DHPs were similar. Communication strategies were assessed by identifying observable verbal and non-verbal behaviours. The verbal behaviours of both the DHPs and the children were calculated by time duration in seconds and frequency for each behaviour over the whole consultation per minute. DHPs' non-verbal behaviours were calculated as frequencies over consultation per minute. The coded behaviour data were then exported into SPSS v24 (SPSS Inc., Chicago, IL, USA) for detailed analysis. Descriptive statistics were calculated as mean frequencies of coded behaviours per minute and time duration of each dental preventive visit was used to compare the differences of communication strategies between dentists and EDDNs. Comparison tests were conducted using a nonparametric Mann-Whitney U test. Two-sided tests were used throughout. Alpha was set to conventional 0.05.

Ethical Considerations

Ethical approval was granted from the East of Scotland Research Ethics Service (Ref: 16/ES/0081). The present project adhered to guidelines of the Declaration of Helsinki and the participating dental health professionals and parents have provided their written informed consent to take part in this study prior to the preventive dental appointments.

RESULTS

Demographic profiles of dental professionals and their GDPs

One GDP was located with a SIMD score of “1” (most deprived), one scored “5” (least deprived) and remaining two scored “2” indicating the second most deprived area. The DHP sample was comprised of 3 dentists (one male) and 2 EDDNs (both female). The qualified clinical experience of the participating DHPs covered a wide spectrum, with one female dentist having over 10 years, another woman dentist having 5 years’ experience and the male dentist completing his vocational training. The two EDDNs had over 10 years of post-qualification experience.

Children’s demographic and dental experience characteristics

Forty-four child-parent dyads participated in the study with 28 being treated by EDDNs. There was a statistically significantly greater proportion of girls in the dentist group compared with the EDDN group whereas larger proportions of single children were seen by the EDDN compared with the dentist group. There were no statistically significant differences in child age (months) or previous FV experience between the two DHP groups (Table 1).

Communication strategies: duration and number

The preventive care appointment duration ranged from 130 seconds to 1,756 seconds with an average of 736 seconds. The total number of communication strategies (verbal and non-verbal behaviours) based on 44 video observations was 7,299. The average number of distinct verbal and non-verbal behaviours of codes assigned per appointment is 161. This was calculated from 29 communication behaviours of the child patient, 88 communication behaviours of the DHP and 42 communication behaviours of the parent.

Communication behaviours of dentists and EDDNs

In terms of consultation time, EDDNs spent longer (mean=1,015 seconds) than dentists (mean=350 seconds) with children and parents [$Z=-5.34$: $p<0.001$]. Figure 2 shows that differences were found in the mean frequency of dental professionals' communication behaviours, adjusted for appointment duration time. EDDNs used more frequently the following verbal behaviours during FVA such as: using a 'pet name', providing a 'joke/humour', 'reward (e.g. stickers)', 'distraction using toys', 'permission seeking' and non-verbal praise behaviours to engage the young child. Dentists more frequently used the verbal behaviour techniques of: 'instruction', 'praise', 'tell-show-do (TSD)' and 'relate experience' (i.e. relating the current FVA to the child's previous FVA experience).

During oral health advice session, communication strategies such as 'information giving' and providing or 'offering for question' to parents were used more frequently by EDDNs whereas the dentists more frequently used 'information seeking (questioning the parent)' to prompt the conversation with parents concerning their child's oral hygiene and diet. The communication behavioural code 'dentally engaging talk' (e.g. 'how many times do you brush your teeth?') to engage the children, was used more frequently by EDDNs than dentists for both FVA and oral health advice consultation (Table 2). In terms of non-verbal behaviours, EDDNs were more likely to use models to demonstrate to both child and parent toothbrushing techniques compared with their dentist colleagues (Table 2).

Children's responses to different DHPs' communicative strategies

Children treated by EDDNs compared with those treated by dentists had more communication behaviours such as: 'speech yes' (e.g. agreeing to sitting in the dental chair), 'speech other' (e.g. responding to comments about their teddy bear) and 'dental talk' (the child responding to dental health-related questions e.g. toothbrushing) (Table 3 and Figure 3). Children treated by dentists were more likely to say no to any procedure which was coded as, 'speech no'.

DISCUSSION

The aim of this exploratory study was to identify the time taken and the types of communication strategies used by DHPs when interacting and providing fluoride varnish application and oral health advice to children with their parents in the primary dental care setting.

Child-centred approaches are being discussed once more. The importance of including the child and the recognition of child participation in the healthcare setting [11, 12, 13], is now seen as central to positive treatment outcomes. The inclusion of child participation in dental healthcare, is therefore needed if practitioners are communicate appropriately and address children's needs for successful health outcomes [12, 13]. A number of communication strategies were observed during the preventive dental appointment between the DHPs who participated. The findings indicated that both dentists and EDDNs used a range of different communication styles during fluoride varnish application sessions and that these were used at different frequencies, even when adjusted for consultation time, between the professional groups. Dentists tended to use more direct communication strategies such as 'instruction' when interacting with parents to enhance the children's attention and compliance. It may be suggested, however, that the focus upon parental engagement at the expense of the child resulted in poorer child participation. This proposition is supported by the findings reported here as the children were less responsive to the dentist's communication strategies. EDDNs' observed communication strategies were different. They engaged first with the child and used 'child speech' to involve and provide an opportunity for the child to participate in the preventive care appointment. They exhibited this by 'permission seeking', 'telling jokes' and providing rewards to encourage involvement, the child's participation using OHA prior to FVA. This, we believe, supported and reinforced the child's coping behaviours during the preventive care appointment. These findings also indicate that dentists are more likely to use what might be summarised as an authoritarian style of communication. EDDNs on the other hand, were

more likely to use a more 'symmetrical' communication style; that is working with the child at their level commensurate with their stage of psychological and cognitive development.

The work here represents an exploratory video recording study which used a purposive sample of children and DHPs working in a handful of general dental practices. Nevertheless, the in-depth assessment of communication strategies (verbal and non-verbal behaviours) of 44 video recordings and the identification of 7,299 codes allows a number of hypotheses to be raised regarding the use of different communication strategies between DHPs and their child patients. Therefore, future research is needed to explore the generalisability of the findings presented here. The effectiveness and the underlying mechanism of communication through various behavioural techniques can be inspected in detail and therefore enable evidence to be collated on how to encourage young children to receive dental care.

Previous work has indicated that children have a limited contribution to triadic communication in the healthcare setting [14, 15, 16]. In our study we found that children's participation was measurable and almost exclusive to their interactions with EDDNs. Furthermore, our study indicates that younger children (under 6s) are able to have oral health related conversations with dental professionals, when space and time is made available for them to do so. The children also appeared to understand the oral health-related information tailored by dental professionals when simple and appropriate language was used, as in the case of EDDNs. It may be postulated that these findings support the adoption of a child-centred approach by tailoring oral health-related messages for young and very young children [17].

There are limitations of this study. Successful fluoride varnish applications between the two DHP groups were the same. This was an exploratory study [18] and as such, it was not necessary to conduct a power calculation to reveal an FVA difference between staff groups,

therefore we did not wish nor were we are unable to test which communication strategies were more effective in improving successful fluoride varnish application.

This exploratory study, nevertheless, demonstrated that differences in communication behaviours between dentists and EDDNs when providing preventive dental care to children were observed. The participating EDDNs seemed to provide a more empathetic and patient-centred treatment alliance with children, whereas dentists used more direct communication strategies to gain children's treatment cooperation, via the parent. Further research is needed to test the effectiveness and identify appropriate timing of using communication strategies to obtain young children's treatment cooperation.

DECLARATION OF INTERESTS

The authors declare that they have no competing interests.

ACKNOWLEDGEMENTS

We would like to acknowledge the funding from the Scottish Government. We would also like to thank all the dental staff, child patients and their parents for their kindest support in taking part of the Study.

REFERENCES

1. Klingberg G. Dental anxiety and behaviour management problems in paediatric dentistry: a review of background factors and diagnostics. *Eur Arch Paediatr Dent*. 2007 Feb;8(4):11–15.
2. Freeman R. Communicating with children and parents: recommendations for a child-parent-centred approach for paediatric dentistry. *Eur Arch Paediatr Dent*. 2008 Feb; 9 Suppl 1():16-22.
3. Sheller B. Challenges of managing child behavior in the 21st century dental setting. *Pediatr Dent*. 2004 Mar-Apr; 26(2):111-3.
4. Saadia M, Valencia R. Communicating with the New Generations. The Challenge for Pediatric Dentists. *J Clin Pediatr Dent*. 2015 Summer;39(4):297-302. doi: 10.17796/1053-4628-39.4.297.
5. Patton MQ. *Qualitative research and evaluation methods*. Third edition. Newbury Park, CA: Sage Publications, 2002.
6. Zhou Y, Cameron E, Forbes G, Humphris G. Development of a novel coding scheme (SABICS) to record nurse-child interactive behaviours in a community dental preventive intervention. *Patient Educ Couns*. 2012;88(2):268-76. doi: 10.1016/j.pec.2012.01.001.
7. ter Horst G1, Prins P, Veerkamp J, Verhey H. Interactions between dentists and anxious child patients: a behavioral analysis. *Community Dent Oral Epidemiol*. 1987 Oct;15(5):249-52.
8. Weinstein P, Getz T, Domoto P. Temporal patterns of the behavior of young children in the dental chair. *J Pedod*. 1985; 9 (3):188-99.
9. Yuan S, Humphris G, Macpherson LM, Ross A, Freeman R. Development of an Interaction Coding Scheme (PaeD-TrICS) to record the triadic communication behaviours in the paediatric primary care dental consultations: a video-based observational study. *BMC Oral Health*, submitted on 1st Feb, 2019.

10. Noldus Information Technology Retrieved on 23 May 2011
from: <http://www.noldus.com/human-behavior-research/products/the-observer-xt>.
11. Coyne I, Hallström I, Söderbäck M. Reframing the focus from a family-centred to a child-centred care approach for children's healthcare. *J Child Health Care*. 2016, 15(2): 494-502.
12. Freeman R. Communicating with children and parents: recommendations for a child-parent-centred approach for paediatric dentistry. *Eur Arch Paediatr Dent*. 2008 Feb;9 Suppl 1:16-22.
13. Marshman Z, Gupta E, Baker SR, Robinson PG, Owens J, Rodd HD, Benson PE, Gibson B. Seen and heard: towards child participation in dental research. *International Journal of Paediatric Dentistry*, 2015, 25 (5). 375 - 382. DOI: <https://doi.org/10.1111/ipd.12179>
14. Cahill P, Papageorgiou A. Triadic communication in the primary care paediatric consultation: a review of the literature. *Br J Gen Pract*. 2007;57(544):904-11.
15. Gabe J, Olumide G, Bury M. 'It takes three to tango': a framework for understanding patient partnership in paediatric clinics. *Soc Sci Med*. 2004;59(5):1071-9.
16. Tates K, Meeuwesen L. Doctor-parent-child communication. A (re)view of the literature. *Soc Sci Med*. 2001;52(6):839-51.
17. NICE Public Health Guideline NG30 - Oral health promotion: general dental practice. [December, 2015]. Available at: <https://www.nice.org.uk/guidance/ng30>
18. Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. *Designing Clinical Research*. 4th Edition ed. Philadelphia: Lippincott, Williams & Wilkins; 2013.

Table 1. Comparison of demographic and dental care experiences of child patient groups treated by dentists and EDDNs.

Characteristics of children		EDDN	Dentist	Pearson χ^2	P-value
Gender	Girl	11(39.3%)	12(75%)	5.21	0.023
	Boy	17(60.7%)	4(25%)		
Parental presence	Other parent(s)/guardian	5(17.9%)	1(6.3%)	1.165	0.392
	Mother only	23(82.1%)	15(93.8%)		
Sibling present	No sibling present	22(78.6%)	7(43.8%)	5.495	0.019*
	Sibling present	6(21.4%)	9(56.3%)		
Previous experience of FVA	No	6(21.4%)	2(12.5%)	0.546	0.689
	Yes	22(78.6%)	14(87.5%)		
FVA outcome	Success	6(21.4%)	3(18.8%)	0.045	1.000
	Refusal	22(78.6%)	13(81.3%)		

*P<0.05

Table 2. Comparison of mean frequency of verbal and non-verbal communicative behaviours between dentists and EDDNs (frequency/min)

Behaviour code	EDDNs Mean (SD)	Dentists Mean (SD)	MW-U test Z	Sig.
Relate experience	.05 (.11)	.13 (.16)	-2.04	.042*
Social talk	.64 (.40)	.53 (.61)	-1.16	.246
Information giving	1.17 (.49)	.72 (.45)	-3.03	.002**
Information seeking (Questioning)	.35 (.52)	.95 (.82)	-2.88	.004**
Joke/Humour	.62 (.47)	.35 (.52)	-2.48	.013*
Instruction	.31 (.21)	1.43 (.93)	-4.15	.000***
Permission seeking	.07 (.09)	.03 (.09)	-2.73	.006**
Praise	.79 (.53)	2.21 (1.19)	-3.68	.000***
Dentally engaging talk	1.65(.95)	.56 (.54)	-3.88	.000***
TSD talk	.13 (.13)	.42 (.43)	-2.80	.005**
Reward	.49 (.21)	.09 (.17)	-4.68	.000***
Distraction using toys	.25 (.43)	.04 (.12)	-2.18	.029*
Offer for questions	.02 (.04)	0 (0)	-2.15	.032*
NV touch playful	.14 (.23)	.01 (.05)	-3.09	.002**
NV Procedure-related demonstration	.24 (.13)	0 (0)	-5.26	.000***
NV Praise	.05 (.07)	0 (0)	-2.99	.003**
Pet name	.17 (.13)	0 (0)	-4.76	.000***

*P<0.05, **P<0.01, ***P<0.001.

Table 3. Comparison of the mean child responding behaviours between the patient groups of dentists and EDDNs (frequency/min)

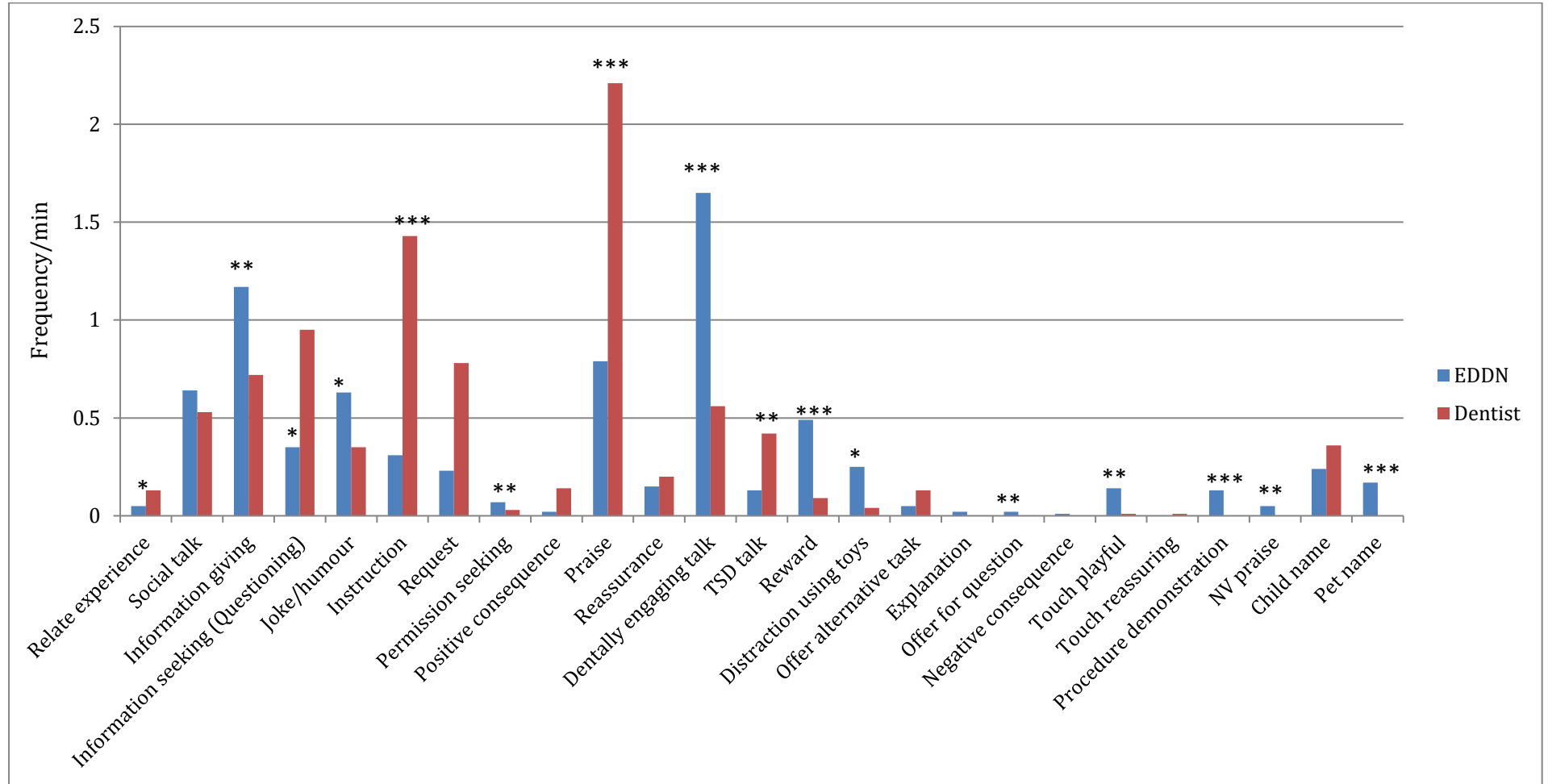
Behaviour code	EDDNs Mean (SD)	Dentists Mean (SD)	MW-U test Z	Sig.
Speech yes	.36 (.49)	.07 (.18)	-2.93	.003**
Speech no	.07 (.18)	.12 (.49)	-2.47	.014*
Speech other	.91 (.83)	.25 (.31)	-3.03	.002**
Dental talk	.23 (.31)	.05 (.15)	-2.62	.009**

*P<0.05, **P<0.01, ***P<0.001.

Figure 1. Paediatric Dental Triadic Interaction Coding Scheme (6.Yuan et al. 2018)

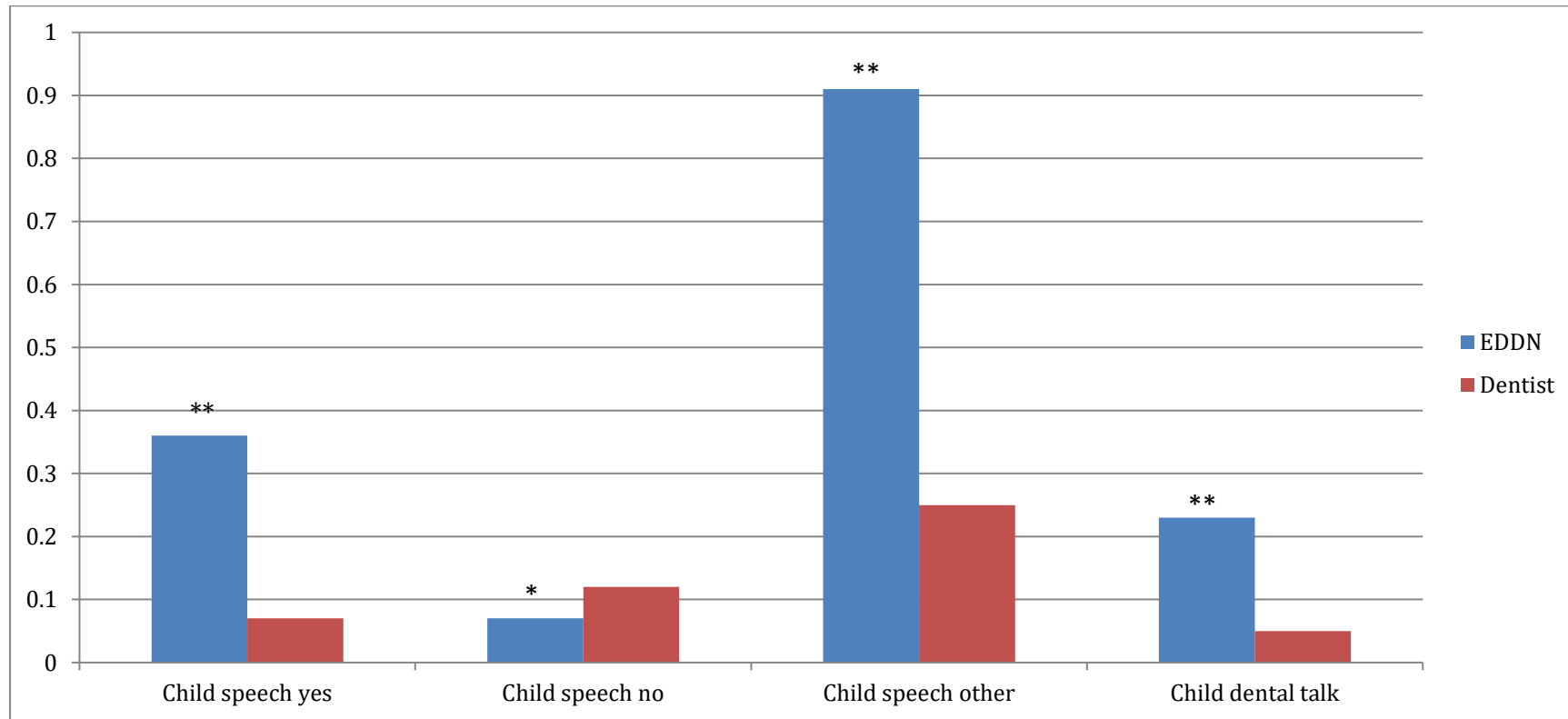
Behaviour	Operational definition
Adult behaviour:	
Dental Professional (DP), Parent	
Social talk	DP/Parent's non-dentally related talk
Information giving	DP/Parent gives oral health/procedure related information.
Information seeking (Questioning)	DP/Parent asks for oral health/procedure related information.
Joke/Humour	DP makes joke/humour on the child that may include a laughter
Child name	DP/parent calls child by name.
Pet name	DP/parent calls child an endearing name
Distraction	DP/parent distracts the child by referring to a toy/painting etc.
Praise	DP/parent makes positive comment on child's behaviour or attitude
Reassurance	DP/parent describes ease and pleasantness of treatment.
Positive consequence	DP/parent informs child of positive outcome of treatment
Negative consequence	DP/parent informs child of negative/lack of positive outcome if no treatment.
Relate experience	DP relates child's previous dental experience to the present procedure.
Instruction	DP gives the child instruction to carry out an action
Permission seeking	DP consults child for their consent to carry out an action
Request	DP asks child to carry out an action
Dentally engaging talk	Any talks DP uses to get child engaged in the oral health related talk/treatment
Tell-show-do talk	DP uses tell-show-do technique to instruct child to carry out an action.
Reward	DP promises/gives child a reward, often dependent on behaviour.
Offer for questions	DP offers parent to raise any questions/concerns about child oral health/procedure.
Offer alternative task	DP offers child a lesser challenging task ("Do you want to sit on mum's knees?")
Explanation	DP explains to parent about child uncooperative behaviours which mostly is related to child developmental stage.
Refer to community resources	DP refers to available community resources for parent to access as part of Childsmile procedure.
NV Touch directing	DP physically directs or manoeuvres child's body, limbs head or mouth.
NV Touch playful	DP touches child with hands, brush, mirror etc. in a playful manner.
NV Touch reassuring	DP/parent uses touch to comfort child.
NV Praise	DP/parent's nonverbal behaviour to praise/encourage child
NV Procedure demonstration	DP demonstrates to parent/child on dental related procedures (toothbrushing)
Verbal facilitation	Parent helps DP or child to convey information for easier understanding to the third party.
NV Procedure facilitation	Parent physically directs/manoeuvres child's body to facilitate DP's procedure.
Child behaviour	
Speech (yes)	Child says 'yes'
Speech (no)	Child says 'No'
Speech (other)	Child says any other utterances except for 'yes' and 'no'
Dental talk	Child says anything to reply DP's oral health related question
Crying/groaning	Verbal sound suggesting pain, fear, upset.
Laugh	Verbal sound suggesting enjoyment.
NV Hide face/mouth	Child covers face with arms or hands.
NV Push away (hand)	Child uses hand/s to push DP or instrument away.
NV Sits up/moves away	Child sits up from lying on the dental chair; stands up (walks way) from sitting.
NV Withdraw	Child withdraws/hides behind/in adult's body.
NV Agreement	Child conveys acceptance by non-verbal behaviours (nodding head).
NV Shakes head	Child conveys refusal/reluctance/disagreement to information/procedure.
NV Turns head	Child turns head away from DP or a normal position.
NV Interact with instrument	Child holds or touches the instruments (brush, cotton wool, mirror, gloves).
NV Toothbrushing demonstration	Child demonstrates toothbrushing to DP.
NV Pointing	Child points to anything in the surgery to attraction parent's attention.

Figure 2. Comparison of communication behaviours between dentists and EDDNs (frequency per minute)



*P<0.05, **P<0.01, ***P<0.001.

Figure 3. Comparison of child responses between dentists and EDDNs treated groups (frequency per minute)



*P<0.05, **P<0.01, ***P<0.001.