Patient autonomy in dental medical decision making – is there a need for shared decision making?

CURRENT STATUS: UNDER REVISION

BMC Medical Informatics and Decision Making

Mareike Benecke
Universitätsklinikum Hamburg-Eppendorf Department Prosthetic Entistry

Jürgen Kasper
OsloMet - storbyuniversitetet Fakultet for helsefag

Corresponding Author
ORCiD: https://orcid.org/0000-0002-2879-6579

Christoph Heesen
Universitätsklinikum Hamburg-Eppendorf

Nina Schäffler
Universitätsklinikum Hamburg-Eppendorf

Daniel Reissmann
UNiversity medical center Hamburg Eppendorf Prosthetisc Dentistry

DOI: 10.21203/rs.2.17746/v1

SUBJECT AREAS
Medical Informatics  Dentistry

KEYWORDS
Patient preferences, patient participation, patient autonomy, medical decision making, CPS, API
Abstract

Background: Evidence-based Dentistry (EBD), decision aids, patient preferences and autonomy preferences (AP) play an important role in shared decision making (SDM) and are useful tools in the process of medical and dental decisions as well as in developing of quality criteria for decision making in many fields of health care. However, there aren’t many studies on SDM and AP in the field of dentistry. This study aimed at exploring patients’ autonomy preferences in dentistry in comparison to other medical domains.

Methods: As a first step, a consecutive sample of 100 dental patients and 16 dentists was recruited at a university-based prosthodontic clinic to assess and compare patients’ and dentists’ preferences regarding their roles in dental decision making for commonly performed diagnostic and treatment decisions using the Control Preference Scale (CPS). This was followed by a cross sectional survey to study autonomy preferences in three cohorts of 100 patients each recruited from general practices, a multiple sclerosis clinic, and a university-based prosthodontic clinic. A questionnaire with combined items from the Autonomy Preference Index (API) to assess general and the CPS to assess specific preferences was used in this process.

Results: Dentists were slightly less willing to deliver control than patients willing to enact autonomy. Decisions about management of tooth loss were however considered relevant for a shared decision making by both parties. Highest AP was expressed by people with multiple sclerosis, lowest by patients in dentistry (CPS means: dentistry 2.5, multiple sclerosis 2.1, general practice 2.4, p=.035). Patients analysis showed considerable differences in autonomy preferences referring to different decision types (p<.001). More autonomy was needed for treatment decisions in comparison to diagnostic decisions, for trivial compared to severe conditions, and for dental care compared to general practice (all: p<.001).

Conclusion: The study results showed substantial relevance of patient participation in decision making in dentistry. Furthermore, a need has been discovered to refer to specific medical decisions instead of assessing autonomy preferences in general.

Background
In a broader definition, patient autonomy (PA), in the medical context, describes patients making use of their right of self-determination when dealing with health subjects. PA refers to patients’ self-perception, perceptions by others as well as behavior in the fields of information seeking and processing, medical care, treatment, and medical and dental decision making. Applied to the field of medical decision making, PA, in western countries, is increasingly considered an important quality criterion. In medical decisions with a need to involve a health expert, PA becomes apparent in the patients’ participation in communication as described in the concept of shared decision making [1]. 

PA has been recommended for many reasons: First, for ethical reasons it is axiomatic to put every effort on supporting individuals’ freedom of will as included in the guideline of the British General Medical Council [2]. These guidelines acclaim, that there is a responsibility of patients to inform themselves before making decisions. Second, as making best use of scientific evidence for the individual patient is only possible when patient values are met, PA is considered an essential part of evidence-based medicine (EBM). Evidence-based dentistry (EBD) takes into account the best available literature, clinical experience and patient factors to guide the dentist [3, 4]. In particular, patients’ preferences should guide the choice, if the evidence does not clearly imply a first choice—which is called an equipoise condition—or even regularly if more than one option is available. Third, patients’ autonomous participation in their health management might improve health outcomes due to a better fit of health decisions with individual needs. In fact, the evidence in this respect is ambiguous [5].

There is no reason why the standards to involve patients into medical decisions should not apply to dentistry too. Most of the medical decisions in dentistry consist of multiple options each implying a specific set of patient relevant consequences and risks, e.g. there are several ways to manage tooth loss. Besides the option to do nothing and to live with a tooth gap, it might in an individual case be possible to use implants as a potentially long-term solution instead of a bridge. A bridge does not require a series of invasive procedures but would affect the adjacent teeth. Basically, the decision has to be made by ranking qualitatively different advantages, disadvantages and risks, such as sustainability of dentures, invasiveness of the treatment, costs, follow-up costs and last but not least aesthetics [3]. This kind of decision is predestined for an approach that involves the patient.
Currently, knowledge regarding actual relevance and extent of implementation of PA and SDM in the field of dental medical care and research is limited. While several of the available publications just provided a conceptual debate [3, 6–8], papers presenting empirical data [9–13] support the claim for more emphasis on patient autonomy and patient involvement in dentistry. While information preferences are consistently high, patient preferences to participate in decision making turn out lower [9, 10, 12, 13] but are however significant. Participation preferences are expressed also by older patients [11] and increase with severity of the treatment [12]. A model for the dentistry encounter provided by Sondell and Soderfeldt [14] indicates the importance of patient participation, however, without specifying quality of the information process. Little evidence is available on current habits, dentists’ attitudes and realization of patient involvement in dentistry [15]. Some evidence suggests that decision aids including evidence-based information are helpful tools to increase patient involvement [16–18] or patient satisfaction [19] or even cooperation and compliance [20]. However, detailed analyses of patient preferences regarding their autonomy in decision making in dentistry, a comparison with other medical populations, and the corresponding attitudes of the health care provider are still lacking.

This study aimed at exploring patients’ autonomy preferences in dentistry in comparison to other medical domains. The comparison aimed at identifying intra- and inter-individual variation of autonomy preference depending on the type of decision and setting.

Material And Methods
Subjects, study design, and setting
This cross-sectional study consists of three parts.

Firstly, a survey was carried out mapping the distribution of typical dentistry decisions at the Department of Prosthetic Dentistry, University Medical Center Hamburg-Eppendorf (UKE) in Hamburg, Germany over a two-week period.

Secondly, the study surveyed patients’ autonomy preferences (PAP) in relation to respective attitudes hold by dentists regarding dental treatment decisions in the Department of Prosthetic Dentistry at the UKE. A consecutive sample of 100 patients and all dentists of the clinic (n = 16) was recruited.
Third, a cross sectional survey of PAP in dentistry, general practice (GP) and a multiple sclerosis (MS) outpatient unit were assessed and compared by consecutively recruiting 100 patients in each setting (N = 300 in total). The dental patients and the patients with multiple sclerosis were contacted at the UKE. The patients in the primary care setting were recruited in three different GP offices, which were members of a primary medical care research network.

The study protocol (PV3452) was reviewed and approved by the Institutional Review Board of the Medical Association in Hamburg, Germany. All participants gave written informed consent for record, analyses and publication of their data collected within during study. Participants and researchers received no monetary compensation.

**Measures**

**Medical decisions in dentistry**

Decisions were registered by the dentists immediately after each appointment using a documentation sheet. This sheet based on a list of medical decisions, generated by a panel of two experienced dentists and an expert of methods, and underwent several evaluations to allow for the decision-categories being built both exhaustively and disjunctively. Complete registration of decisions in the unit over a two weeks period was supposed to obtain an estimate of each decision's frequency of occurrence.

**Autonomy preferences**

PAP was in this study assessed using two different methods, focusing medical decision making in general and regarding specific medical problems. This proceeding provided occasion to carve out the extent of comparability of the two approaches. Focusing specific decisions in addition, also allowed for intra-individual comparisons of PAP.

**The Dental Decision Questionnaire**

Based on the dental decisions identified in the first part of the study, a questionnaire with 15 items was developed to assess PAP using the Control Preference Scale (CPS) [21] as the response scale. This item set comprised decisions referring to a wide range of dental diagnostics and treatments and covered to the greatest extent the entire spectrum of dental care except orthodontics and oral
surgery (Table 1).

The CPS used the so called “pick-one” approach providing an ordinal five-point response scale in a single item test evaluating a specific decision. The five steps range from “I want to make the decision alone” (0) to “I want the doctor to make the decision for me” (4). This item can be applied to any medical problem either prior to the decision to assess specific PAP or after the decision to assess the extent of autonomy actually enacted.

The resulting Dental Decision Questionnaire (DDQ) was applied in the second part of our study to assess PAP. In addition, all participating dentists were asked to rate each decision on the list using the CPS with regard to the decision’s sensitivity for patients’ preferences. For this assessment, decisions were provided as hypothetically.

The Medical Decision Questionnaire
Based on several medical problems, ten were selected and corresponding items with response scales according to the CPS format were created. This selection covered three medical domains (4 items for GP, 3 items for dentistry, 3 items for MS) and provided variation between diagnostic vs. treatment, and serious vs. bagatelle decisions. Again, the willingness to involve themselves into making the medical decision was hypothetically.

This Medical Decision Questionnaire (MDQ) was applied in the third part of the study. With one exception, all patient groups (dental, general medicine, multiple sclerosis) were provided with the same set of items. Items specifically focusing decisions in the field of multiple sclerosis were not given to dental of GP patients.

The Autonomy Preference Inventory
The Autonomy Preference Inventory (API) [22] originally consists of six items prompting the patients to indicate their AP referring to medical decisions in general. The API presents statements indicating more or less autonomous attitudes exemplified by standard situations and provides for each statement a 5-point Likert scale ranging from “I completely agree” (0) to “I totally disagree” (4).

However, polarization of the items is varying and has to be unitized in accord to the CPS before analysis. The API also provides a set of items assessing information needs. However, API was in our
study applied by just using the 6 AP-items. With regard to Cronbach’s alpha, the API scale turned out to show a much higher internal consistency when item 4 and 6 were excluded (6-item scale: alpha = .59; 4-item scale: alpha = .81). This finding is in line with previously published data of the API [22]. All analyses were therefore based on the four-item API. The API was applied only in the third part of the study.

**Statistical Analyses**

For analysis of PAP as well as preference sensitivity as assessed with the API or the DDQ and the MDQ with the CPS the response scale, measures for central tendency (means) and variability (standard deviation; SD) were calculated for the entire population and subgroups considering the scores as quasi continuous. Our statistical approach involved several steps. Firstly, distribution of decisions in the studied department was analyzed descriptively by presenting frequencies and percentages.

Secondly, doctors’ and patients’ attitudes about to which extent decisions should be shared were compared using unpaired t-tests for each of the 15 dental decisions in the DDQ.

Third, consistency of PAP within an individual and with respect to setting and type of medical decision was investigated using the scores of the API and the MDQ. Intra-individual consistency of PAP was approached by calculating Pearson correlations between API mean scores and each of the single MDQ items. Moreover, for each patient the range was calculated between minimal and maximal PAP as indicated within the set of ten MDQ items addressing specific medical decisions. In addition, by transposing the data matrix and using cases as variables and the MDQ items as cases, individual standard deviations were calculated as a measure of to which extent specific PAP varied within individual patients. This was followed by comparing PAP assessed with the API and the MDQ between groups met in the three different settings using analysis of variance (ANOVA). Finally, the impact of the specific type or character of a decision was studied using a repeated measurement design and the variants of decisions as within group factors in an ANOVA. Alpha correction for multiple testing was performed using Bonferroni correction. To compensate for violation of sphericity Greenhouse and Geisser corrections were used. Missing values were estimated by interpolating the available data at
fixed rates.

Results

Distribution of decisions in dentistry

Overall, 272 dental appointments and within these a total of 673 individual decisions (2.5 per appointments) were documented (Table 1). Most frequently, dentists documented decisions about whether or not to use anesthesia for a treatment procedure (43%). Also, decisions about which anesthetic to use, treatment of caries, tooth extraction, problems with dentures or diagnostic radiology appeared in more than 25% of the appointments. Decisions on management of tooth loss or acutely inflamed nerves were made in about 10% of the appointments.

Patients’ role preferences and dentists’ ratings on decisions’ sensitivity for individual preferences of dental decisions

When using the DDQ, dentists rated the decisions’ sensitivity for individual preferences on average over all assessed 15 dental decisions with a CPS mean of 2.6 (SD 0.5). Patients indicated a role preference for the same selection of decisions with a CPS mean of 2.1 (SD 0.5). This suggests, on average, dentists considered the patients’ participation in decision making less appropriate than the patients’ expressed preference (p = .008). This difference was statistically significant in 6 out of 15 decisions (Table 1). No differences were found to point into the opposite direction (patients desiring less autonomy than doctors would consider appropriate).

Both parties, however, allocated the locus of the decision slightly more on the doctor’s side, indicating more or less agreement about that dental decisions should mainly be made by the dentist rather than the patient. In contrast to most of the other decisions, those about managing tooth loss were considered relevant to patient involvement consistently by both parties (Table 1). Irrespective of progression stage or location of tooth loss in either the anterior (visible) or the posterior area of the mouth, all four decisions about tooth loss management were rated to be suitable for shared decisions by both dentists and patients.

Intra-individual variance in patient autonomy preference

When using the MDQ, eleven percent of the patients showed consistent PAP over the test set of 10 decisions (Table 2). 39% indicated PAP within the 10 decisions ranging over three within the theoretical range of five categories, 24% of the patients used a minimum of four categories or even
exhausted the full theoretical range of PAP. The mean standard deviation of patient CPS values covered 18% of the scale range (mean SD = 0.7; range 0–4).

Variability in patients’ reports of their own PAP was also reflected by medium or even low correlations between general PAP measured via API and specific PAP measured via MDQ. Closest association between a PAP regarding a specific decision and API were shown for the decision whether to treat multiple sclerosis with immunotherapy (r = .43), while the decision whether to treat a cough with a syrup was not at all correlated with API (r = .08). In mean, API and MDQ showed moderate correlation (r = .36).

Patient autonomy preference and setting
General PAP assessed by the API differed substantially between the settings with highest general PAP expressed by patients with MS and lowest by dental patients (API means: dentistry 2.5 [SD 1.1], MS 2.1 [SD 1.0], primary care 2.4 [SD 1.0]; p = .035).

A corresponding finding was observed for the level of specific decisions assessed using the MDQ (Table 2). While patient involvement in general medical decisions was considered equally relevant in all three settings, there were indeed differences if it comes to dental medical decisions. Variation seems to be due to the distance of the setting from the very decision’s domain. However, patients directly asked at the dental department were less willing to involve themselves into dental decisions than patients from the two other settings. Particularly, MS patients claimed to be involved in dental decisions more than dental patients indicated by higher CPS means in dental patients (3.1) than in MS patients (2.8) or in general medicine patients (3.0; p = .010; Table 2).

Patient autonomy preference and type of a medical decision
According to the MDQ, analyses of decision-specific characters revealed differences in levels of desired autonomy with regard to the type of medical decision, indicated by a statistically significant difference between the ten specific decisions (p<.001). Accordingly, PAP varied significantly between the three domains (CPS means: general medical decisions 3.2; dental decisions 3.0, MS related decisions 3.2; p<.001; Table 2).

This also applied within the medical domain settings. Patients desired more autonomy in decisions
about treatment (CPS mean: 2.9) than about diagnostic measures (CPS mean: 3.4; p<.001). Decisions about treatment of more severe conditions were associated with patients’ less willingness to overtake autonomy (CPS mean: 3.1) compared to less severe conditions (CPS mean: 2.7; p<.001).

Discussion
This study provides insight into the relevance of autonomy preferences in dental settings, which so far has rarely been studied and, to the best of our knowledge, not been compared with other medical domains.

In the first part of the study, a high number of dental decisions were identified as of high relevance for shared decision making. Comparisons of the extent of PAP associated with different types of decisions such as decisions in varying medical domains are complicated due to potential of bias by multiple confounders. Instead of artificially controlling or even standardizing sociodemographic variables in the three patient groups, we tried to approach this task by merging the cross sectional with the cross decisional perspective. The findings of our study provide insight into both the importance of patient involvement in dentistry and the PAP-constructs sensitivity towards several sources of variability. We found dental patients desiring to be involved into medical decisions that concern to them. This preference is stronger than their dentists’ willingness to share decisions with their patients. In comparison to patients in other medical settings and to decisions related to other medical conditions, however, we found dentistry patients putting less weight on involvement, in particular with regard to dental medical conditions, compared to patients met in at the GP’s or in a chronic care setting. Dental patients seemed in general to claim slightly less autonomy compared to GP patients and chronic patients. With regard to the domain of the hypothetical decisions investigated, all groups indicated differential perception of autonomy needs. Highest PAP was expressed by MS patients, which as they suffer from a chronic condition we consider a group with broad experience in medical decision making and likely to have received high-end patient education. However, MS patients expressed highest PAP with regard to dental decisions. Not surprisingly, autonomy preferences were stronger in treatment compared to diagnostics and less server compared to severe decision subjects. In addition, our data showed, that individual patients differentiated
between decisions of varying kind when indicating their PAP. There is no one score fits all types of decisions. In contrary, the data showed considerable differences in range, extent, and variability of AP. In light of a mean correlation of $r = .35$ between the patients’ general and specific preferences, we have to realize that patient’s API score does not say much about this patient’s desire to be involved in a specific decision such as management of tooth loss or which immunotherapy to use. This finding might challenge the validity of the API scale or may be indicate that API and CPS are somewhat related but obviously far from addressing the same construct. Our data show, however, low consistency even within decisions measured with the same scale (CPS). Since incorporation of various and even extreme preferences is rather the rule than the exception in the patients studied in our survey, the idea of a person value of autonomy preference should be challenged.

We are not aware of another study on PAP involving a comparable variety of measures, perspectives and decisions, limiting the possibility to compare our findings with those of other studies. However, our findings are in accordance with earlier studies on PAP in dentistry, indicating that the majority of patients prefer participating in the decision process, i.e. SDM [9, 10, 12, 13, 23]. Interestingly, while SDM was the preferred decision model slightly more dental patients preferred a passive role than an active role, an aspect consistently reported in these studies and in accordance to our findings. In the medical context, a considerable number of patients also prefer a passive role [24], as observed in our study. Furthermore, variance of PAP with respect to setting and type of medical decision is also well documented [25, 26]. And finally, findings from our study are in line with conclusions from other studies, suggesting doubts with regard to validity of patient reported control preferences [27, 28].

We consider this and the size of the study (total $N = 400$) as strengths of the study as it contributes to the debate of validity of the construct of general autonomy preferences. On the other hand, the character of our study is clearly exploratory implying a couple of weaknesses limiting final conclusiveness of our data. As we for practical reasons abstained from documentation of sociodemographic as well as disease-specific data the study is lacking control of multiple potential cofounders known from the literature as important for PAP, such as age, education and medical condition. However, we addressed cohorts naturally existing in the three example settings. Our
results regarding the impact of decision type are therefore preliminary, however, clear enough to demonstrate importance of the decision type for the AP. In addition, our study is far from representative for dentistry in general. We studied patients and decisions in a university-based prosthodontic clinic. As well, when estimating preference sensitivity, we used a convenient sample of dentists of a prosthodontic clinic, which means a highly selective group in many regards. Data from e.g. resident dentistry might have given other results with regard to group and setting. Methodological concerns might rise with regard to our assumption of PAP as continuously scaled construct. It could be argued that the role distributions as given in the five CPS categories are distinctive quality which hardly can summarized, aggregated or correlated the way we did. However, several studies using the CPS considered the scale as quasi continuous and applied parametric statistical tests [23, 25, 26], as we did.

This study has important clinical implications. To enable patients embracing the role in decision making they prefer, decision support technologies should be developed according to existing guidelines [29]. However, implementation of SDM most effectively works in combination of doctor- and patient-sided approaches [30]. This could mean to develop decision specific decision aids for patients and using doctor training in SDM as an implementation strategy. Such doctor trainings already exist and were also tested in a dental setting, e.g. doktormitSDM [31, 32]. This training turned out to be efficient in increasing communication skills among dentists leading to stronger participation of dental patients in the decision-making process. However, the substantial intra-individual differences in PAP with respect to the actual decision and the setting as well as the inter-individual differences in PAP suggest that there is no strategy that fits all. Involvement may not be acceptable or appropriate for everyone or every situation. In contrast, there is a need to identify individual factors affecting patients’ preference for involvement to provide a tailored approach for patient empowerment in the specific setting [33]. Applying this approach, dentists might better meet patients’ individual preferences for participation in decision making and, as a consequence, provide better patient-oriented care.

Conclusion
Based on the study's findings it can be concluded that dental patients' desire to be involved in decision making is comparable to other medical contexts. Furthermore, the study revealed also pronounced decision-type specificity of PAP, a finding which strongly challenges the construct of a general (implying consistent) PAP. And finally, our study showed an urgent need to keep up with the current developments in doctor patient communication and decision making in dentistry.

**Abbreviations**

PA Patient autonomy  
AP Autonomy preference  
PAP Patient autonomy preferences  
SDM Shared decision-making  
EBM Evidence based medicine  
EBDEvidence based dentistry  
CPSControl preference scale  
APIAutonomy preference inventory  
DDQDental decision questionnaire  
MDQMedical decision questionnaire  
GPGeneral practitioner  
MSMultiple sclerosis

**Declarations**

*Ethics approval and consent to participate / consent to publish*

The study protocol (PV3452) was reviewed and approved by the Institutional Review Board of the Medical Association in Hamburg, Germany. All participants gave written informed consent for record, analyses and publication of their data collected within during study. Participants and researchers received no monetary compensation.

*Availability of data and materials*

All materials and data are available at the corresponding author

*Competing interests*
None of the authors has competing interests

**Funding**

The study was conducted without any funding

**Acknowledgements and Authors’ Contributions**

All authors have contributed in writing the manuscript, read and approved the final version (MB, JK, CH, NS, DR). Data collection was conducted by MB, JK, NS. Statistical analyses were conducted by JK and DR. Raw data in SPSS 23 format are available from the corresponding author, JK. We are grateful to Wilma Pahl (University of Hamburg) for her help in defining the decisions to be investigated. The authors received no financial support and declare no potential conflicts of interest with respect to the authorship and publication of this article.

**Tables**

Table 1 – Dentists’ and patients’ ratings for patient autonomy in a set of dental decisions (DDQ with CPS as response scale). Lower scores indicate higher patient autonomy
Table 2 - Patients’ participation preferences related to general medicine, dentistry, and multiple sclerosis (MDQ with CPS as response scale) for all patients and stratified for setting. Lower scores indicate higher autonomy preference.
## Decision type / medical domain

### General Medicine

*Assume you have a sore throat, nasal congestion and cough for the last three days. Who should make the following decisions?*

| 1 | Whether to run an x-ray of your chest? | 3.2 (0.8) | 3.2 (0.8) | 3.2 (0.7) | 3.2 (0.8) |
|---|---|---|---|---|---|
| 2 | Whether to treat your condition with cough syrup? | 2.8 (1.0) | 3.1 (0.9) | 2.7 (1.1) | 2.7 (1.0) |

*Assume that during routine examination a high blood pressure of 170/100 mmHg is measured. Who should make the following decisions?*

| 3 | Whether to undergo 24-hour blood pressure monitoring? | 3.5 (0.9) | 3.4 (0.8) | 3.5 (0.8) | 3.5 (0.9) |
|---|---|---|---|---|---|
| 4 | Whether to lower the blood pressure by use of drugs? | 3.4 (0.8) | 3.3 (0.8) | 3.4 (0.8) | 3.5 (0.9) |

Average over decisions in general medicine | 3.2 (0.6) | 3.3 (0.7) | 3.2 (0.6) | 3.1 (.6) |

### Dentistry

*Assume you have lost 1 to 3 teeth in the visible range and meet the dentist. Who should make the following decisions?*

| 5 | Whether to use local anesthesia? | 2.7 (1.0) | 2.7 (1.0) | 2.9 (0.9) | 2.4 (1.0) |
|---|---|---|---|---|---|
| 6 | Whether to apply diagnostic radiology? | 3.6 (0.9) | 3.6 (1.0) | 3.7 (0.8) | 3.5 (0.8) |
| 7 | Whether and which treatment of your tooth loss is suitable? | 2.7 (0.9) | 2.7 (0.8) | 2.8 (0.8) | 2.7 (0.9) |

Average over decisions in dentistry | 3.0 (0.7) | 3.0 (0.7) | 3.1 (0.6) | 2.8 (0.7) |

### Multiple sclerosis

*Who should make the following decisions on your chronic disease?*

| 8 | Whether and immunotherapy to use as long-term treatment? | 3.1 (0.8) | n/a | n/a | 3.1 (0.8) |
|---|---|---|---|---|---|
| 9 | Whether to Magnet Resonance Imaging is needed? | 3.5 (0.8) | n/a | n/a | 3.5 (0.8) |
| 10 | Whether to use steroid treatment to manage an acute relapse? | 3.2 (0.9) | n/a | n/a | 3.2 (0.9) |

Average over decisions in multiple sclerosis | 3.2 (0.7) | n/a | n/a | 3.2 (0.7) |

Total | 3.1 (0.6) | 3.1 (0.6) | 3.2 (0.5) | 3.1 (0.6) |

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