PAPER

# Desire for information and alternative therapies of pet owners is associated with empathy and partnership-building of veterinarians

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**Objectives:** The relationship between the pet owners' desire for information and preference of alternative therapies and the veterinarians' ability to build partnership and communicate empathically was investigated using quantitative multifactorial analysis.

**Materials and Methods:** In an online survey, 1270 German pet owners were asked about their experience of veterinary appointments regarding communication and relationship building. Additional questions included the type and number of pets, years of animal husbandry, age, gender and education level. The factors associated with the pet owners' desire for further information and alternative therapies were analysed in two multivariable linear models. A recently published structural equation model consolidated the following as latent factors:
veterinarian's empathic communication, veterinarian's partnership building, pet owners' desire for further information and pet owners' desire for alternative therapies (*e.g.* non-veterinary practitioners).

**Results:** The two veterinarian-related factors of *empathic communication* and *partnership building* were positively associated with each other, but negatively associated with the *pet owners' desires*. Dog owners and participants who owned animals for more than 2 years expressed less *desire for further information*. The *desire for further information* decreased with increasing age. The *desire for alternative therapies* was more among animal owners of more than 2 years and those visiting the same veterinary practice for over 2 years.

**Clinical Significance:** Veterinarians' empathic communication and partnership building are key factors that satisfy clients' desires for information and alternative therapies. This comprises communicational skills regarding information sharing, as well as emotional aspects.

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## INTRODUCTION

In the last few decades, there has been a change in the patients' expectations in medical decision-making, which also reflects in veterinary medicine (Böcken *et al.* 2016). Today, most pet owners desire to be respected as equal partners when they visit veterinarians with their pets. They wish that the veterinarian should explain every aspect regarding the of their pet health of their pet from diagnosis to treatment in an easy and comprehensive manner (Coe *et al.* 2008). Furthermore, they want to have the freedom to pose questions and express their opinions, and make decisions together as far as the circumstances permits. These aspects can be summarised under the term "shared decision making" (SDM), which was introduced into medi-




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cal practice in the 90s (Veatch 1972, Brody 1980, Emanuel & Emanuel 1992, Deber 1994, Charles *et al*. 1997). In SDM, the involved parties (pet owner and veterinarian) share information as well as responsibility for the decisions that are made. The health care professional explains the possible options (diagnostics and therapies), while the pet owners are encouraged to express their values and preferences and take an active role in the decision-making process (Charles *et al*. 1997). SDM is the fundamental attribute of relationship-centred care (RCC) (Committee of Quality and Health Care in America 2001) and ensures the building of a joint venture between the veterinarian and pet owner with the aim of providing the best care to the pet (Shaw *et al*. 2006). Alternative decision models are the "paternalistic" approach, in which the physician or veterinarian takes the decisions, and the "professional-as-agent" approach, in which the physician or veterinarian only supports information and options, but the patient or pet owner takes the decision (Cornell & Kopcha 2007).

Jane R. Shaw's working group started with applications in veterinary medicine in the 2000s (Shaw *et al*. 2004, Shaw *et al*. 2006, Shaw *et al*. 2008), and this concept has been taught and applied by many groups (Coe *et al*. 2007, Adams & Kurtz 2017, Bard *et al*. 2017, Gaida *et al*. 2018). The ideal application of SDM may be limited in certain scenarios, for *e.g*. in cases of emergency, limited health literacy or the individualistic expectations of the pet owner (Murphy 2006, Bard *et al*. 2017).

RCC was established to meet the growing desires of equal participation in medical decision-making; hence, it is the framework for SDM (Suchman 2006). It describes medical care appointments in which the relationship between patients and health professionals is driven by mutual respect, and diagnosis and treatment decisions are developed in close cooperation (Tresolini & Pew-Fetzer Task Force 1994). The RCC visits are characterised as medically functional, informative, responsive, facilitative and participatory, though the relative importance of each characteristic varies (Roter 2000).

In veterinary medicine, RCC refers to the veterinarian-pet owner relationship that recognises the pet owners' perspectives and their expertise in the pet's care (Frankel 2006, Shaw *et al*. 2006). In veterinary medicine, RCC includes a third party: the animal. Pet owners and veterinarians have the responsibility to make the best decisions for the animal. Therefore, the desires of both the animal and the pet owner must be considered in all decisions. Because the interests of the animal and the pet owner may differ, it is not clear to whom the veterinarian owes a primary duty (Coe *et al*. 2007).

The implementation of RCC creates opportunities as well as challenges for veterinary practitioners. Clients demand detailed information in easy language rather than medical terminologies. Veterinarians have to treat pet owners respectfully and as equal partners concerning the pet's health, and the pet owners and veterinarians usually meet in situations where the pet owners may be stressed due to the suffering of their pets. Therefore, successful communication and relationship building with the pet owner are essential tools to provide the best care for the patient (Adams & Kurtz 2017).

Although the implementation of RCC in veterinary appointments is challenging, its application can help to meet not only the requirements of the veterinarian, but also the pet owners' desire for information (Shaw *et al*. 2004, Shaw *et al*. 2006, McDermott *et al*., 2019).

Information is one of the main drivers of RCC. For the pet owner, comprehensive information about the causes and effects of disease and therapeutic options is necessary in order to play an active role in the medical decision-making process. Moreover, pet owners can better deal with the risks of diseases if they have sufficient information (Coe *et al*. 2007, Stoewen *et al*. 2014). It is important to mention that relationships are only partly build on health or disease-related information; the exchange of personal information has been shown to be more important in building a trusted relationship (Shaw *et al*. 2004, Kanji *et al*. 2012, Stoewen *et al*. 2014).

Thus, communication skills are essential to build a good partnership with clients and achieve therapeutic goals, as described by Hall et al. in 1995 (Hall *et al*. 1995). Veterinarians often communicate in a directive style that reflects a paternalistic role (Bard *et al*. 2017). Expressions of empathy, use of open-ended questions and paraphrasing statements seem to be underutilised during veterinarian appointments, despite the increased compliance associated with their usage (Shaw *et al*. 2004, Kanji *et al*. 2012). However, pet owners prefer that veterinarians explain the situation to them using non-technical language rather than medical terms and at a pace that they can follow. Good communication includes posing suitable questions, repeating key information and taking enough time to answer all questions satisfactorily (Stoewen *et al*. 2014).

Empathy is also essential for veterinarians to gain the trust of pet owners. Stoewen *et al*. (2014) reported that pet owners expected veterinarians to be empathic, kind and confidential, and be able to deal with the pet owner's feelings.

Although research on veterinary communication remains a nascent and dynamic field, some studies have recently been published on it (McDermott *et al*. 2015, Adams & Kurtz 2017, Bard *et al*. 2017, McDermott *et al*. 2017, Gaida *et al*. 2018, Kogan *et al*. 2019). The RCC elements of *veterinarian's empathic communication, veterinarian's partnership building*, *pet owners' desire for further information*, and *pet owners' desire for alternative therapies* have been consolidated as latent factors in a recently published structural equation model (Küper & Merle 2019). Alternative therapies include consultation with alternative health providers, such as homeopaths, osteopaths, or physiotherapists. We analysed the outcomes of these factors in the context of animal species, animal holder's experience, and sociodemographic information.

The purpose of the study was to investigate the pet owners' perceptions of the relationship between veterinarians and pet owners as well as the influencing factors. We conducted an online survey among pet owners and developed a structural equation model revealing four latent variables: *veterinarian's empathic communication*, *veterinarian's partnership building*, *pet owners' desire for further information*, and *pet owners' desire for alternative therapies* (Küper & Merle 2019).

## MATERIALS AND METHODS

### Questionnaire

As described by Küper & Merle (2019), the questionnaire included relevant aspects of a relationship-centred veterinary appointment and the respective pet owners' expectations based on the literature. Parts of the questions were adapted from validated questionnaire items from human medical research (Scheibler *et al.* 2004, Kriston *et al.* 2010). Additional questions included those related to influencing factors, such as the type and number of pets, structure of the veterinary practice, age, gender, income, and education level. The questions were selected in collaboration with veterinary researchers and practitioners. The questionnaire was validated in a three-stage pretesting phase including expert reviews (veterinarians, psychologists, social scientists), cognitive pretesting (12 participants) and standard pretesting (26 participants). The final questionnaire comprised of 58 items, most of which were scored on a 6-point Likert scale. The aforementioned influencing factors were either categorical (*e.g.* animal type) or continuous (*e.g.* age).

### Data collection

The questionnaire was made available in both online (LimeSurvey v2.56, open-source, hosted on university servers) and paper-based versions. The survey was published on the project website (www.fokustiergesundheit.de), which was promoted in the project-related Facebook page and in 281 local and nationwide pet-associated Facebook groups after administrators provided permission. Overall, 200 questionnaire hard copies were sent to all parts of the country, such as in horse stables and pet shops.

Participants had to provide informed consent actively before the survey could be started. Data collection was anonymous, and neither personal nor other sensitive data were collected. No question was mandatory to answer. Individuals who owned at least one companion animal and visited a veterinarian practice for medical check-ups, illnesses, or operations in the last 2 years could participate in this nationwide study. The online survey was open from August 15, 2016 to October 31, 2016. Printed versions were also collected during this period. In total, 1270 questionnaires were completed, 25 of which were hard copy versions.

### Data analysis

Data were extracted from the online and printed survey questionnaires, stored in a Microsoft Excel® 2016 file, and statistically analysed using Statistical Package for the Social Sciences for Windows (SPSS version 25, IBM Corp., Armonk, NY, USA) and R version ×64 3.6.3 (R Core Team 2020) with RStudio version 1.1.463 (R Studio Team 2020). Figures were created using Microsoft Excel® 2016. Directed acyclic graphs (DAGs) were produced using the Dagitty software (dagitty.net) to display the assumed relationships between the influencing factors (Textor *et al.* 2016).

As described by Küper & Merle (2019), four latent factors were extracted from the questionnaire items with respect to the pet owners' perceptions of the veterinarian–pet owner relationship using exploratory factor analysis and structural equation modelling. These factors were (1) *veterinarian's empathic communication*, (2) *veterinarian's partnership building*, (3) *pet owners' desire for further information* and (4) *pet owners' desire for alternative therapies*. Descriptive results are displayed in terms of diverging stacked bar charts in the Results section. Factor 3 was log-transformed to achieve normality. All other continuous variables, *i.e.* age, and factors 1, 2 and 4, complied sufficiently with the assumption of normality evaluated by visual inspection of histograms and qq-plots.

We used separate regression models to investigate the association of *pet owners' desire for further information* and *pet owners' desire for alternative therapies* (*e.g.* homeopathic, physiotherapist or osteopathic therapy approaches) with the following variables: animal species (dog, cat, rabbit, horse, exotic animals); number of animals kept (categorised); years of animal husbandry (categorised); years with the same practice (categorised); type of practice; preferred decision model (paternalistic, participative or professional-as-agent); gender; age (continuous); education level; medical profession; number of household members (categorised); net household income (categorised); and location of residency (town, country).

The associations between age and years of animal husbandry as well as age and education level were evaluated using *t*-test for independent samples. Analysis of variance (ANOVA) was used to investigate the association of age with the preferred decision model. Multivariable logistic regression including adjusted odds ratios (aOR) and 95% confidence intervals (CI) was applied to investigate the role of age, education level and number of household members as predictors of the location of residency.

We used multivariable linear regression models with manual backward elimination. Only complete datasets were included, which resulted in 998 of 1270 observations. In the first model, we investigated whether factor 3, *pet owners' desire for further information* (dependent variable), was associated with one of the listed influencing factors: factor 1, *veterinarian's empathic communication*; factor 2, *veterinarian's partnership building*; or factor 4, *pet owners' desire for alternative therapies*. In the second model, the same approach was adapted for factor 4, *desire for alternative therapies*, as a dependent variable and factors 1, 2 and 3 as influencing factors. Figure 1 displays the overall DAG. The level of significance was set at 0.05.

Polynomials were adjusted to continuous influence factors in order to achieve linear relationships with the dependent variable. The optimal polynomial degree was selected by comparing one model to the next complex form using ANOVA. This resulted in a quadratic polynomial of factor 1 (*empathic communication*) and a cubic polynomial of factor 2 (*partnership building*) and factor 4 (*desire for alternative therapies*) with factor 3 (*desire for further information*) as the dependent variable. Age and factor 2 were included in their quadratic forms with factor 4 (*desire for alternative therapies*) as the independent factor.

All two-way-interactions were included in the model and removed one by one based on P-values, until only statistically significant interactions remained. All main factors were retained in the model, as they were considered influencing or confounding factors. The models presented include all main factors plus

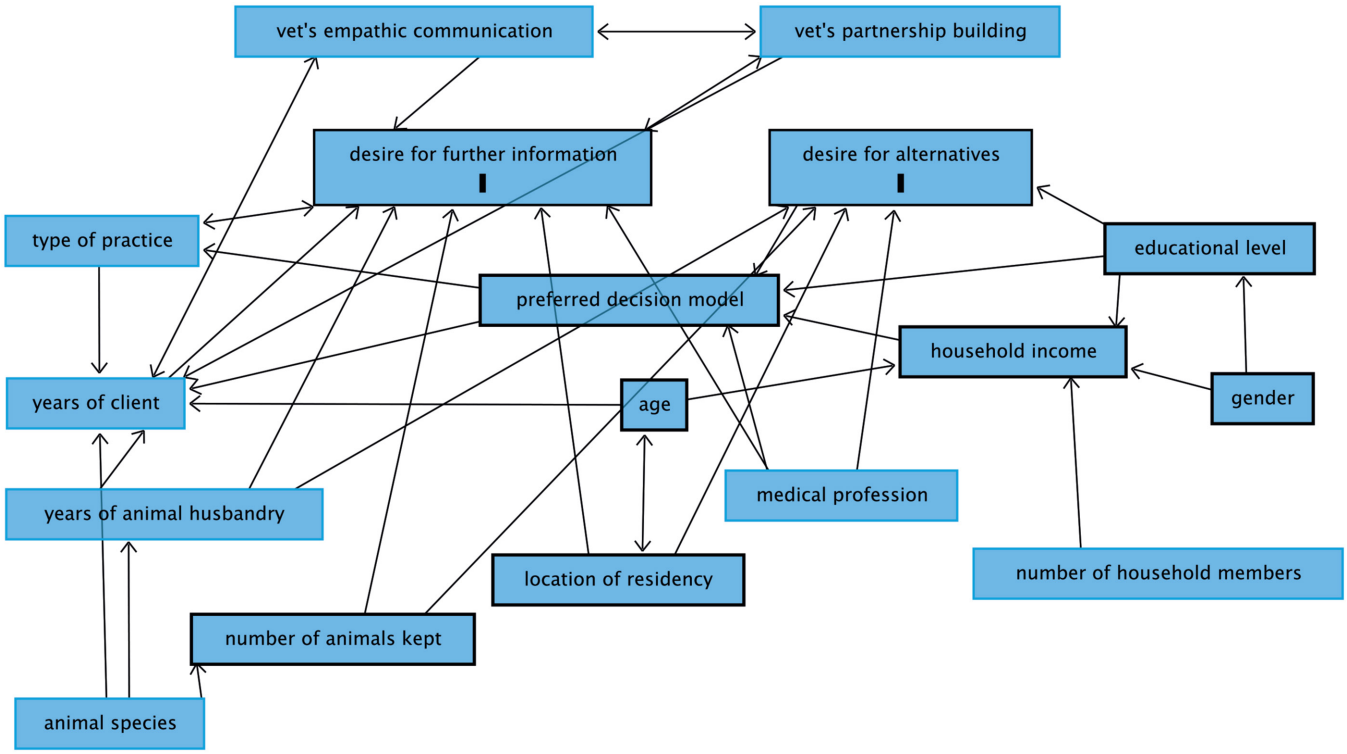


**FIG 1. Directed acyclic graph displaying the causal relationships between all variables included in a survey on German pet owners' perceptions of communication with their veterinarian. Variables marked with "I" were used as dependent variables in linear regression analyses**

statistically significant interactions. Model diagnostics included normality and homoscedasticity of the residuals. Since residuals were heteroscedastic, robust parameter estimates of the HC3-method are reported in the results.

### Ethics statement

Within the study neither personal nor sensible data were collected. Participation was voluntarily and anonymous. Before starting the questionnaire, participants perceived detailed information about the aims of the study, which data will be collected and how the data will be evaluated. Consent needed to be given actively by each participant. For no personal rights nor any German and European data protection laws could be violated, we refrained from receiving approval of an ethic committee.

## RESULTS

### Description of questionnaire items of latent factors

The results of the variables used to build factors 1 to 4 are summarised in Figs 2, 3, and 4. It is evident that most people liked their veterinarians and attested them to be capable of *empathic communication*. Regarding *partnership building*, some items showed tendency towards disagreement, but most answers were positive. Only the following questions were answered with disagreement rather than agreement: how much information the pet owner already had and how much he/she desired; whether the pet owner could implement the therapy in his/her everyday lives; and whether the veterinarian explained the potential side effects of the drugs.

Most of the participants did not express the *desire for further information* during or after an appointment. Only 11.8% (150) participants agreed with the sentence, "I feel uncomfortable to ask questions because my vet might think I did not listen to his/her explanations properly." Furthermore, 25.2% (320) participants agreed with the sentence, "I often get the feeling that my vet does not have enough time to answer all my questions." The remaining items focused on personality-related reasons such as, "I am very nervous during a consultation at the vet." Agreement ranged from 32.4 to 36.4%.

Around 28% of participants had already consulted with an alternative health provider or homeopath (28.0%) and a physiotherapist or osteopath (27.5%) for animals, partly due to dissatisfaction with the vet's care. It is noteworthy that a high percentage of owners strongly disagreed for both these items (54% each). A large proportion of participants (45.0%) wished that "their vet would be more open to alternative/complementary treatment options."

### Description of influencing factors

The frequencies and percentages of the categorised variables are displayed in Table 1. Dogs (73.1%), cats (44.7%) and horses (44.9%) were the most frequently mentioned animal species. Most of the participants were female (94.5%) and kept animals for more than 10 years (73.5%). The participative decision model was most preferred (74.3%). The average age of the owners was 38.7 years. The values of the factors were dimensionless results from the exploratory factor analysis with mean 0 and standard

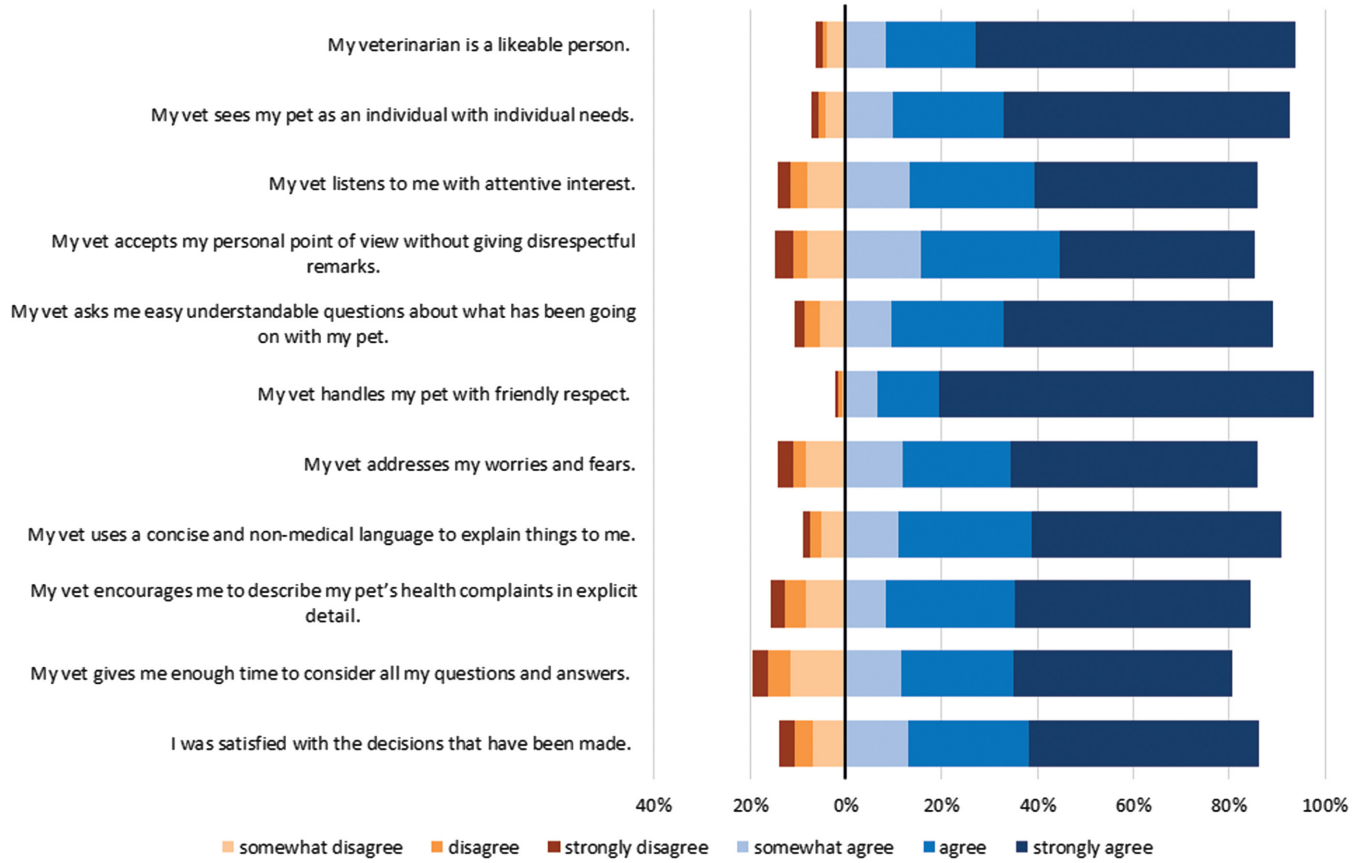


**FIG 2. Results of variables comprising factor 1, *veterinarian's empathic communication*, in a survey on German pet owners' perceptions of communication with their veterinarian. Items were identified by exploratory factor analysis and structural equation modelling by Küper & Merle (2019)**

deviation 1. Factor 3 was logarithmized to the basis of 10. Since the logarithmic values of negative values cannot be calculated, "4" was added to each value before logarithmic transformation in order to achieve positive results. Hence, the mean of factor 3 log was 0.59.

Logistic regression revealed that age, education level and number of household members were associated with the location of residence. There were significantly younger participants in towns than in the rural areas (mean age: 37.7 ± 12.6 years *versus* 39.9 ± 12.2 years; aOR: 0.99; 95% CI: 0.98 to 0.99; P=0.002). Persons with education level of a vocational diploma or higher had significantly higher odds of living in towns than in rural areas (70.4% *versus* 60.6%; aOR: 1.51; 95% CI: 1.17 to 1.94; P=0.001). At the same time, there were significantly more participants from two-person households (58.2% of all two-person households from rural areas; aOR: 1.58; 95% CI: 1.17 to 2.14; P=0.003) and multiple-persons households (70.1%; aOR: 2.62; 95% CI: 1.87 to 3.68; P < 0.001) in the rural areas than in towns (global, P < 0.001). In addition, people with higher education levels (vocational diploma or higher) were significantly younger than those with lower education levels (38.0 ± 12.4 years *versus* 41.0 ± 12.2 years; P < 0.001, *t*-test).

## Pet owners' desire for further information

The latent factors 1, 2 and 3 were the most important factors influencing the factor of *pet owners' desire for further information*. Including only these factors into a linear regression model explained 45.9% of the total variance satisfactorily (R-squared 0.459, data not shown). This is reflected in small P-values in the full linear regression model, as shown in Table 2 and Table S1. Since the values of the factors are mathematical constructs, regression coefficients can only be interpreted by means of the algebraic sign (increasing or decreasing effect) and the values themselves (reported as regression coefficients "b"). High perception of *empathic communication* and *partnership building* of the veterinarian, both important aspects of SDM, were associated with less *desire for further information* (*empathic communication*, P < 0.001; *partnership building*, P < 0.001 for linear, P < 0.001 for quadratic and P=0.131 for cubic term). Medium levels of *partnership building* resulted in the highest *desire for further information*, while high levels of *partnership building* were associated with a decreased *desire for further information* (Fig S1). A high *desire for alternative therapies* was associated with a high *desire for further information*, although this relationship was linear only in the cubic term (P ≤ 0.001 for linear, P < 0.001 for quadratic and P=0.026 for cubic term). Fig S1 shows that pet owners with a rather low *desire for alternative therapies* also had a low *desire for further information*, but the *desire for further information* increased strongly when the *desire for alternative therapies* increased. When the *desire for alternative therapies* was average or more, the *desire for further information* was high, but at a stable level. Other factors also revealed an association with the *desire*

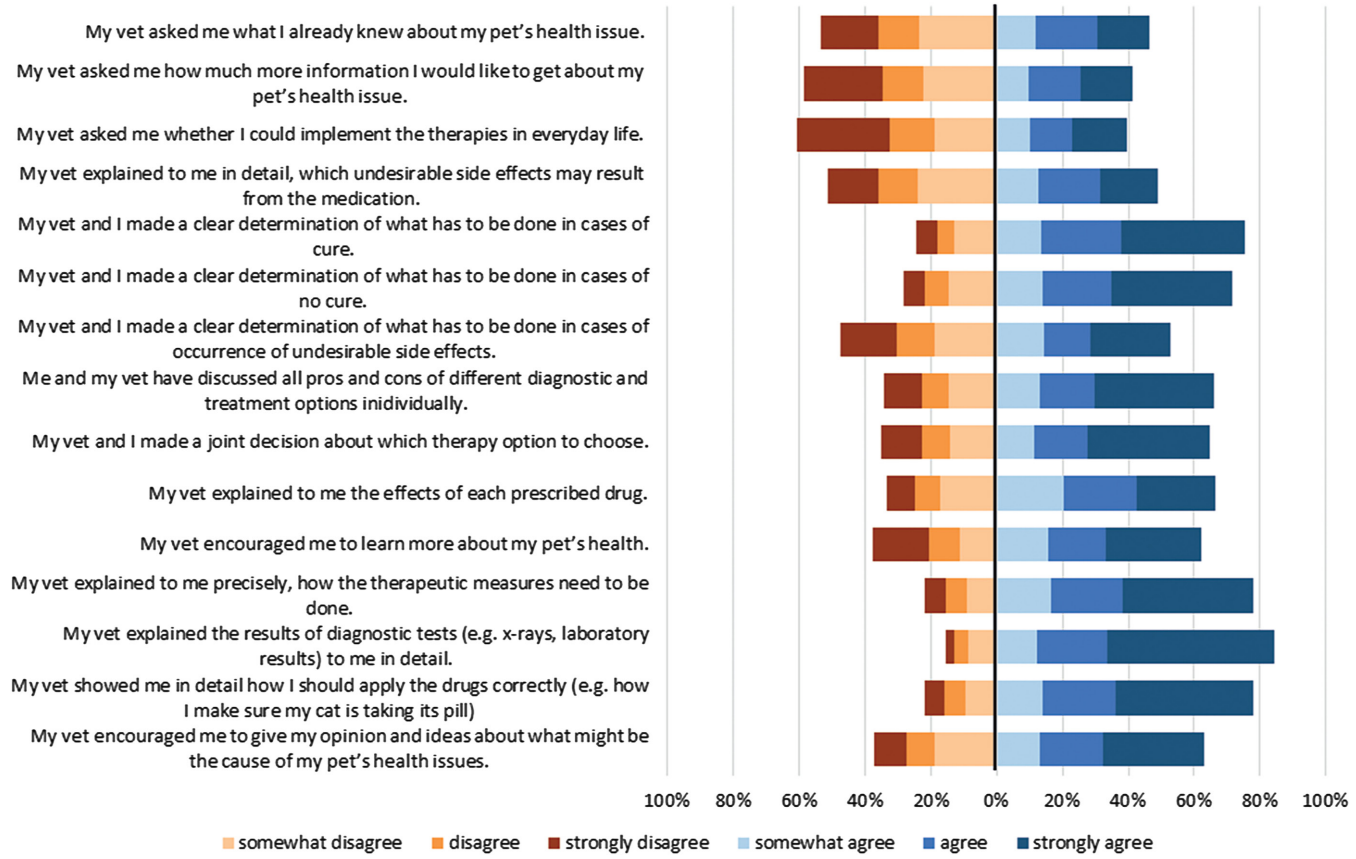


**FIG 3. Results of variables comprising factor 2, *veterinarian's partnership building*, in a survey on German pet owners' perceptions of communication with their veterinarian. Items were identified by exploratory factor analysis and structural equation modelling by Küper & Merle (2019)**

*for further information*. Age was significantly associated with the *desire for further information* (P=0.018), because older people indicated less *desire for further information*. The owners of dogs (P=0.001) expressed significantly lesser *desire for information* as compared to participants without dogs. Additionally, owners of more than six animals seemed to have less *desire for further information*, although not statistically significant (P=0.110). Statistically significant low *desire for further information* was reported by participants who kept animals for more than 2 years (P=0.008). Interestingly, persons who visited a single veterinarian practice required more information than those who visited a veterinary clinic (P=0.065 for global test for differences between types of practices). Although neither the preferred decision model nor gender revealed any significant influence, the interaction between both variables was noticeable, even though it was formally not significant (P=0.066). While women in general indicated a greater *desire for further information*, in men, it depended strongly on their preferred decision model. If the paternalistic approach was preferred, the *desire for further information* was highest; if the veterinarian was seen as an agent, the *desire for further information* was the lowest. The education level, medical profession, number of household members and net household income did not play a significant role. Differences could be observed between participants from rural areas and towns (higher desire in the latter), although the difference was not statistically significant (P=0.091).

With an adjusted R-squared of 0.533, the model explains more than half of the variance and indicates that important influencing factors of the *desire for further information* are covered by the model.

## Pet owners' desires for alternative therapies

The results of the linear regression model are displayed in Table 3 and in Table S2. As expected, factors 1, 2 and 3 were significantly associated with factor 4 (P < 0.001 each). High perception of *empathic communication* and *partnership building* values was associated with a low *desire for alternative therapies*, but the *desire for further information* was positively associated with the *desire for alternative therapies*. The participants with dogs (P=0.005) or horses (P < 0.001) expressed a greater *desire for alternative therapies* than those without. People who kept animals for up to 2 years had lesser *desire for alternative therapies* than those who kept animals for more than 2 years (P=0.001). On the other hand, participants who went to the same veterinarian for more than 2 years had a significantly higher *desire for alternative therapies* than those who did not (P=0.035). It was not surprising that animal owners who preferred the professional-as-agent approach expressed a significantly higher *desire for alternative therapies* than those who preferred the paternalistic approach (P=0.003). However, this did not apply to persons who had been clients of the practice for less than 2 years and preferred paternalistic or participative decision models. They had a significantly higher *desire for alternative therapies* as com-

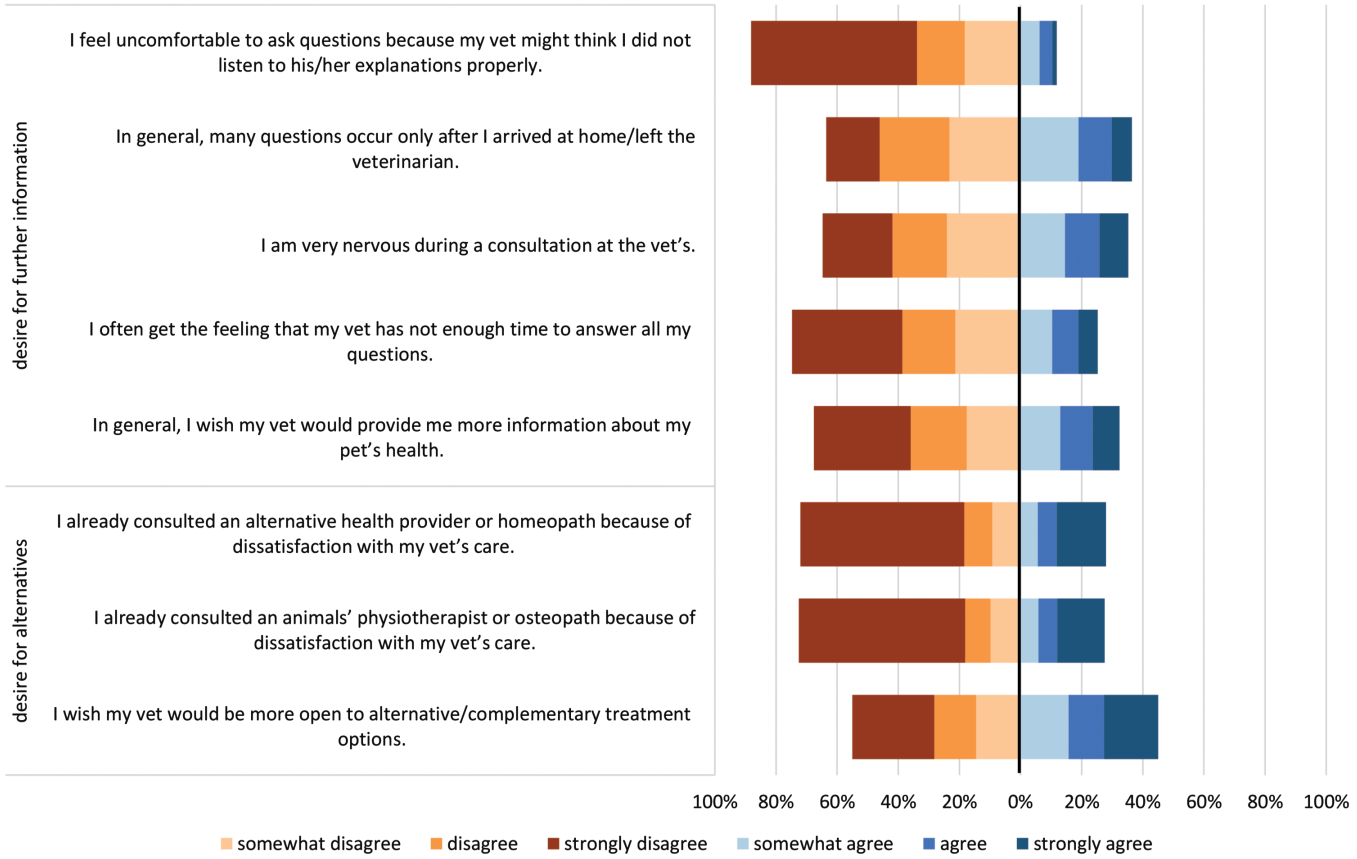


**FIG 4. Results of variables comprising factor 3, *pet owners' desire for further information*, and factor 4, *pet owners' desire for alternative therapies*, in a survey on German pet owners' perceptions of communication with their veterinarian. Items were identified by exploratory factor analysis and structural equation modelling by Küper & Merle (2019)**

pared to those who had been clients of the practice for more than 2 years [P=0.010 (paternalistic), P=0.009 (participative)]. Participants from towns had a higher *desire for alternative therapies* than those from rural areas (P=0.011). An interaction was identified between gender and location. While women in rural areas had a significantly higher *desire for alternative therapies* as compared to men (P=0.004), there was no such observation in towns. Participants who lived in a household with more than two persons had lesser *desire for alternative therapies* than those living in one or two-person households (P=0.017). However, interaction analysis revealed that persons with medical professionals had a significantly less *desire for alternative therapies* when they lived alone (P=0.005). Older participants tended to have a high *desire for alternative therapies*, although this effect was not statistically significant [P=0.088 (linear term), P=0.107 (quadratic term)]. The number of animals, type of practice, education level, and net household income did not show a significant association with *desire for alternative therapies*. The adjusted R-squared of 0.379 indicates that there were additional influencing factors that were not included in the model.

## DISCUSSION

It became obvious that the four latent factors identified in the structural equation model covered the major factors that were associated with the pet owners' *desire for further information* or *desire for alternative therapies*, as presented by Küper & Merle (2019). However, other factors that concerning the relationship between veterinarians and pet owners as well as personal factors of the pet owner could play some role in the complex situation of veterinary medical appointments.

The *desire for further information* and *desire for alternative therapies* are associated with factors regarding the pet owner's personality as well as with factors corresponding to pet owners' experiences. Personality factors include the preferred decision model, educational level, gender, and age. The location of the residency, animal species, number of animals kept, years of animal husbandry, type of practice, veterinarian's empathic communication and veterinarian's relationship building ability are experiences that might implicate the desire for further information and/or desire for alternative therapies.

Age, gender, preferred decision model and educational level could not be identified as important influencing factors, although the *desire for further information* showed a statistically significant, albeit slight decrease, with age. This corresponds to one earlier study that found that the use of the Internet for pet health information did not differ much in several demographic topics (Kogan *et al.* 2012). Roter & Hall (2006) reported that patient characteristics such as age, gender and educational level influence patient–physician relationships. These findings can

**Table 1. Frequencies and percentages of answers given for categorical questions in a survey on German pet owners' perception of communication with their veterinarian (n=998)**

| | | Number | % |
|---|---|---|---|
| Dog | No | 306 | 26.9 |
| | Yes | 830 | 73.1 |
| Cat | No | 629 | 55.3 |
| | Yes | 508 | 44.7 |
| Rabbit | No | 947 | 83.3 |
| | Yes | 190 | 16.7 |
| Exotic animal | No | 1003 | 88.2 |
| | Yes | 134 | 11.8 |
| horse | No | 626 | 55.1 |
| | Yes | 511 | 44.9 |
| Number of animals per species | Up to 6 animals | 1012 | 89.0 |
| | More than 6 animals | 125 | 11.0 |
| Animal husbandry | Up to 2 years | 57 | 5.0 |
| | More than 2 years | 1080 | 95.0 |
| Client in same practice since | Up to 2 years | 299 | 27.7 |
| | More than 2 years | 781 | 72.3 |
| Type of practice | Single veterinarian | 375 | 33.3 |
| | Up to 3 veterinarians | 462 | 41.1 |
| | More than 3 veterinarians | 117 | 10.4 |
| | Veterinary clinic | 171 | 15.2 |
| Preferred decision model | Paternalistic | 169 | 14.9 |
| | Participative | 845 | 74.3 |
| | Professional-as-agent | 123 | 10.8 |
| Gender | Female | 1024 | 94.5 |
| | Male | 60 | 5.5 |
| Educational level | Secondary school or less | 390 | 34.9 |
| | Vocational diploma or higher | 729 | 65.1 |
| Medical profession | No | 320 | 28.1 |
| | Yes | 817 | 71.9 |
| Household members | One person | 240 | 21.1 |
| | Two persons | 561 | 49.4 |
| | More than two persons | 334 | 29.4 |
| Net houshold income | 1000 to 1499 € | 124 | 10.9 |
| | 1500 to 1999 € | 182 | 16.0 |
| | 2000 to 2999 € | 312 | 27.4 |
| | 3000 to 4000 € | 221 | 19.4 |
| | >4000 € | 222 | 19.5 |
| | <1000 € | 76 | 6.7 |
| Location of residency | Country | 669 | 58.9 |
| | Town | 467 | 41.1 |

be projected to pet owner–veterinarian relationships (Shaw *et al*. 2006). We found a significant interaction between gender and the preferred decision model regarding the *desire for further information*, where the *desire for further information* did not differ much among women, but men displayed a higher *desire for further information* when they preferred paternalistic models than when they preferred professional-as-agent model. This is not easy to explain and might be due to the small number of participating men (n=60).

The same reason might be true for the interaction between men and women living in towns and rural areas regarding the *desire for alternative therapies*. Men in the rural areas had significantly lesser *desire for alternative therapies* than that of women, while in towns no such difference was observed.

In general, the *desire for alternative therapies* was significantly lesser in the rural areas than in towns. Our results showed that age, education level, and household structure could serve as explanatory factors. Young people tend to move to towns, whereas elderly people live in the rural areas (Bauer *et al*. 2019). The older generation has lower education levels as compared to younger generation ($P < 0.001$, *t*-test), which can give the impression that people in rural areas are less educated (*Region und Bildung. Mythos Stadt – Land*: Bialik & Fry 2019; Prognos 2019). Furthermore, people living in rural areas are more often associated with farm-animal breeding, and hence, they might have a different relationship with animals (Bock & van Huik 2007, Franz *et al*. 2012, Balzani & Hanlon 2020). In conclusion, the reasons for less *desire for alternative therapies* in the rural areas could be associated with age, education level, and household structures.

The same applies to the *desire for further information*. Although formally not significant and not as pronounced as above, the *desire for further information* was expressed to a lesser extent by participants living in rural areas than by those living in towns.

The *desire for further information* depends on the pet owner's knowledge about his/her animal's health. The knowledge presumably increases the longer the pet owner keeps an animal and with the number of animals owned. We could prove this hypothesis because participants who kept animals longer than 2 years expressed significantly less *desire for further information*. Interestingly, the *desire for alternative therapies* was low in participants

**Table 2. Results of multivariable linear regression model for factor 3 *Pet owners' desire for further information* (log.)**

| Parameter | | Regression coefficient b | P-value |
|---|---|---|---|
| Constant | | 0.628 | <0.001 |
| Dog | No | 0.018 | 0.001 |
| | Yes | 0 | |
| Cat | No | 0.002 | 0.650 |
| | Yes | 0 | |
| Rabbit | No | −0.008 | 0.192 |
| | Yes | 0 | |
| Exotic animal | No | −0.010 | 0.160 |
| | Yes | 0 | |
| Horse | No | 0.001 | 0.914 |
| | Yes | 0 | |
| Number of animals per species | Up to 6 animals | 0.011 | 0.110 |
| | More than 6 animals | 0 | |
| Animal husbandry | Up to 2 years | 0.027 | 0.008 |
| | More than 2 years | 0 | |
| Client in same practice since | Up to 2 years | 0.005 | 0.374 |
| | More than 2 years | 0 | |
| Type of practice | Single veterinarian | −0.016 | 0.030 |
| | Up to 3 veterinarians | −0.006 | 0.421 |
| | More than 3 veterinarians | −0.007 | 0.480 |
| | Veterinary clinic | 0 | 0.065 |
| Preferred decision model | Paternalistic | 0.066 | 0.023 |
| | Participative | 0.026 | 0.325 |
| | Professional-as-agent | 0 | 0.182 |
| Gender | Female | 0.030 | 0.234 |
| | Male | 0 | |
| Educational level | Secondary school or less | 0.006 | 0.206 |
| | Vocational diploma or higher | 0 | |
| Medical profession | No | −0.001 | 0.793 |
| | Yes | 0 | |
| Household members | One person | −0.005 | 0.514 |
| | Two persons | −0.004 | 0.384 |
| | More than two persons | 0 | 0.659 |
| Net houshold income | 1000 to 1499 € | 0.012 | 0.280 |
| | 1500 to 1999 € | 0.004 | 0.683 |
| | 2000 to 2999 € | 0.005 | 0.629 |
| | 3000 to 4000 € | −0.005 | 0.654 |
| | >4000 € | 0.001 | 0.954 |
| | <1000 € | 0 | 0.971 |
| Location of residency | Country | −0.008 | 0.091 |
| | Town | 0 | |
| Age | | −0.000 | 0.018 |
| Veterinarian's empathic communication | | −0.020 | <0.001 |
| Veterinarian's partnership building | | −0.052 | <0.001 |
| Veterinarian's partnership building ^2 | | −0.022 | <0.001 |
| Veterinarian's partnership building ^3 | | −0.002 | 0.131 |
| Pet owners' desire for alternatives | | 0.024 | <0.001 |
| Pet owners' desire for alternatives ^2 | | −0.027 | <0.001 |
| Pet owners' desire for alternatives ^3 | | 0.010 | 0.026 |

Survey on German pet owners' perception of communication with their veterinarian (n=998). Robust standard errors were calculated with HC3 method. Interactions are not displayed.
Adjusted $R^2$: 0.533

who kept the animal for less than 2 years. This can be explained by the fact that animal owners of less than 2 years were significantly younger (mean age, 32.4 years *versus* 29.4 years, *t*-test: $P < 0.001$) than those who kept animals longer than 2 years and that the *desire for alternative therapies* increases with age. Regarding the number of animals, no clear association could be established, but there was a tendency that owners of more than six animals showed less interest in further information or alternative therapies.

The veterinarian–client relationship can be assessed not only by the factors of *empathic communication* and *partnership building*, but also by the duration that the client is with the practice and partly by the type of practice. Clients in single practices expressed less *desire for further information* or *desire for alternative therapies* than those in other practice types. In this case, relationship building seems to work in single practice, as the clients trust the veterinarian and, hence, do not feel the desire for further information or alternative therapies. However, the *desire for further alternative therapies* was high among participants who were clients of the practice for more than 2 years.

The number of persons in the household and the interaction with the medical profession were significant factors for the *desire for alternative therapies*. Single and two-person households were more interested in alternative therapies. This could be due to more attention given to the pet in the absence of children living in the household (Twenge 2014). Interestingly, single medi-

**Table 3. Results of multivariable linear regression model for factor 4 pet owners' desire for alternatives**

| Parameter | | Regression coefficient b | P-value |
|---|---|---|---|
| Constant | | −2.185 | <0.001 |
| Dog | No | −0.161 | 0.005 |
| | Yes | 0 | |
| Cat | No | −0.055 | 0.279 |
| | Yes | 0 | |
| Rabbit | No | 0.093 | 0.152 |
| | Yes | 0 | |
| Exotic animal | No | −0.025 | 0.752 |
| | Yes | 0 | |
| Horse | No | −0.256 | <0.001 |
| | Yes | 0 | |
| Number of animals per species | Up to 6 animals | 0.049 | 0.545 |
| | More than 6 animals | 0 | |
| Animal husbandry | Up to 2 years | −0.353 | 0.001 |
| | More than 2 years | 0 | |
| Client in same practice since | Up to 2 years | −0.358 | 0.035 |
| | More than 2 years | 0 | |
| Type of practice | Single veterinarian | −0.017 | 0.824 |
| | Up to 3 veterinarians | 0.039 | 0.593 |
| | More than 3 veterinarians | −0.081 | 0.400 |
| | Veterinary clinic | 0 | 0.445 |
| Preferred decision model | Paternalistic | −0.345 | 0.003 |
| | Participative | −0.135 | 0.218 |
| | Professional-as-agent | 0 | 0.068 |
| Gender | Female | −0.099 | 0.482 |
| | Male | 0 | |
| Educational level | Secondary school or less | 0.067 | 0.213 |
| | Vocational diploma or higher | 0 | |
| Medical profession | No | −0.084 | 0.378 |
| | Yes | 0 | |
| Household members | One person | 0.275 | 0.001 |
| | Two persons | 0.181 | 0.003 |
| | More than two persons | 0 | 0.017 |
| Net houshold income | 1000 to 1499 € | 0.034 | 0.771 |
| | 1500 to 1999 € | −0.006 | 0.958 |
| | 2000 to 2999 € | 0.100 | 0.359 |
| | 3000 to 4000 € | 0.037 | 0.749 |
| | >4000 € | 0.041 | 0.723 |
| | <1000 € | 0 | 0.764 |
| Location of residency | Country | −0.451 | 0.011 |
| | Town | 0 | |
| Age | | 0.019 | 0.088 |
| Age ^2 | | 0.000 | 0.107 |
| Veterinarian's empathic communication | | −0.216 | <0.001 |
| Veterinarian's partnership building | | −0.212 | 0.001 |
| Veterinarian's partnership building ^2 | | −0.078 | <0.001 |
| Pet owners' desire for further information (log.) | | 2.738 | <0.001 |

Survey on German pet owners' perception of communication with their veterinarian (n=998). Robust standard errors were calculated with HC3 method. Interactions are not displayed.
Adjusted $R^2$: 0.379

cal professionals expressed the least *desire for alternative therapies* (n=83); however, we could not find a reasonable explanation for this phenomenon.

Veterinarians can influence pet owners' *desire for further information* and *desire for alternative therapies* by *empathic communication* as well as *partnership building*. Both characteristics can be trained (Cornell & Kopcha 2007) and the desire to satisfy veterinary appointments to achieve compliance in pet owners has been discussed (Kanji *et al.* 2012, Kedrowicz 2015, McDermott *et al.* 2017, Küper & Merle 2019). Our results show that the *desire for further information* is low when the *veterinarian's partnership building* is either high or low. When veterinarians have a good relationship with pet owners, they can provide the pet owners with all the necessary information to satisfy their desires. On the other hand, if the relationship between them is not good, the pet owner is not motivated to think about the health problems of the pet, and perhaps no further questions will arise. It is important to mention that only pet health-related communication and information were investigated in this study. The more important driver for relationship building is personal communication, which was not included in the study (Shaw *et al.* 2004).

The factor of *empathic communication* was described by the involvement of feelings in surgery appointments. The participants assessed the *empathic communication* of their vets as "very positive" with 80% or more positive ratings. It could be shown that *empathic communication* was negatively associated with the *desire for further information* or *desire for alternative therapies*. An empathic atmosphere naturally invites pet owners to pose

all the questions they may have, helps to understand explanations, or simply reduces uncertainty and mistrust (McDermott *et al.*, 2019). This is in accordance with the studies on pet owners' expectations (Stoewen *et al.* 2014). However, the fact that 25.2% of participants felt that their vet did not have enough time to answer all their questions, and 35.3% felt nervous during the visit shows that further education on the principles of empathic communication is desired.

The factor of *partnership building* comprises of communicational skills that are focused on providing information. This not only includes explanation regarding diagnosis, therapeutic options and laboratory results, but also the feasibility of therapeutic measures such as supplying pills and asking whether the owner desires any more information. Veterinarians who are able to communicate all relevant information in an adequate and situational pace and speech have a good chance of satisfying their client's desire for more information. Additional information in printed or electronic forms will help to continue communication between appointments in a practice (Cornell & Kopcha 2007, Jagosh *et al.* 2011, Kanji *et al.* 2012, Stoewen *et al.* 2014).

Although 1270 pet owners participated in the study, and the analyses showed that there were participants from each German federal state, we cannot assume their representativeness for German pet owners in general, because we conducted convenience sampling. We assume that people without internet access (*e.g.* elderly people) and full-time working people may be underrepresented, because either they were not reached by the advertising campaigns or they did not have the time to participate. In addition, more women than men took part at the study which is characteristic for study participation (Dunn *et al.* 2004, Søgaard *et al.* 2004, Kalmijn & Liefbroer 2011). Since more than 70% of the participants were clients for more than 2 years in the same practice, and this was related to high satisfaction with the veterinarian, this study might suffer from selection bias in terms of selecting pet owners who were satisfied with their veterinarian. Pet owners who do not have a good relationship with their veterinarian were probably underrepresented in this study. Thus, our study results draw an optimistic picture of the veterinarian–pet owner relationship.

We can conclude that no *desire for further information* could reflect a good veterinarian–client relationship (client feels optimally informed by veterinarian). The reverse conclusion cannot be drawn, because the reasons for desire for information are manifold and are related to the personal characteristics of the pet owner (Frosch *et al.* 2012), information offered by the veterinarian, amount and source of information the client requires (Kogan *et al.* 2019), and the veterinarian–client relationship.

The fact that the number of members in the German Association of Veterinary Alternative Practitioners increased more than fourfold within 10 years shows that veterinarians have good reasons to invest in good relationships with pet owners in order to stay in the competition (Verband Deutscher Tierheilpraktiker e.V. n.d.). Therefore, it would be helpful for the veterinarian–pet owner relationship to be open-minded in considering alternative medical approaches. If the pet owners value alternative medicine as supportive, they should be encouraged by the veterinarian to share their ideas and experiences. This would give the veterinarians the chance to give their recommendations regarding credible alternative health care providers in cases where this might be a reasonable therapy option or explicitly advise against inappropriate complementary treatments when allopathic medicine is urgently recommended.

Empathic communication does not cover only verbal, but also written information such as brochures or informative handouts. It may build trust to hand out information sheets for common or serious diseases if the information on the sheet complements the information given during the appointment (Lee 2008). Veterinarians who invest more time in relationship building and empathic communication should invoice this service. RCC appointments result in shared decisions that are reasonable and feasible and thus avoid extra costs in therapies that fail. Pet owners are probably more willing to pay the bill if they were an active part of the decisions taken (Brown 2018).

In the future, the integration of basics in communication and social science theory and practice should become part of the veterinary medicine curriculum because empathic and informative professional communication will contribute to a good veterinarian–pet owner relationship and thus improve animal health. Training and education opportunities for RCC should be offered, possibly by veterinary associations. Although RCC focuses on the individual relation between veterinarians and pet owners, some "standard situations" can be addressed in e-learning sessions. Future research should develop strategies for the application of RCC in veterinary practice. It could also be worth investigating the success of empathic communication in relation to the mental health of veterinarians.

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## Author contributions

AK conceived and designed the study, developed the theoretical framework, and implemented it into the preliminary model and questionnaire. Statistical preliminary considerations were done by both AK and RM. RM conducted statistical analyses and drafted the manuscript. AK revised the paper.

## Conflict of interest

AK was temporarily employed in a Start-up business with interest in Digital Animal Health Care (vetevo GmbH) that potentially could have been interested in the study results. The employment relationship started almost 1 year after the start of the research project and ended before publications were completed. The company was not involved in any steps of study design, data collection or evaluation, and no data or findings were provided to the company. Potential conflicts were prevented by obligation towards the privacy statements as well as the policies of good scientific work of the Institute for Veterinary Epidemiology and

Biostatistics. RM declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## Supporting Information

The following supporting information is available for this article:

**Fig S1.** Relationship between *veterinarian's partnership building* and the score ratio of *pet owners' desire for further information*

**Fig S2.** Relationship between *pet owners' desire for alternative therapies* and the score ratio of *pet owners' desire for further information* (2019)

**Table S1.** Results of multivariable linear regression model for factor 3 *Pet owners' desire for further information* (log.). Survey on German pet owners' perception of communication with their veterinarian (n=998). Robust standard errors were calculated with HC3 method. Adjusted R-squared: 0.533

**Table S2.** Results of multivariable linear regression model for factor 4 pet owners' desire for alternatives. Survey on German pet owners' perception of communication with their veterinarian (n=998). Robust standard errors were calculated with HC3 method. Adjusted R-squared: 0.379.