Gender differences in reported dental fear and fear of dental pain

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Abstract -Objectives: Gender differences in dental fear have been of increasing interest among clinicians and researchers. The objectives of this study were to assess: (i) gender differences in reports of global dental fear, global fear of dental pain, and specific fear of dental pain; (ii) how the wording of questions about specific fear of dental pain influences a subjective report, and (iii) the interactions between gender differences and wording effects in the reports of specific fear of dental pain. Methods: A telephonic survey of 504 adult Floridians was conducted in 2004. Data collected included six measures of specific fear of dental pain, one measure of global fear of dental pain, one measure of global dental fear, and demographic information. Results: Women were more likely to report global dental fear, global fear of dental pain, and specific fear of dental pain than men, and both women and men were more likely to report 'dread' of dental pain than 'fear' of dental pain. Conclusions: Our findings suggest that: (i) there are gender differences in reports of dental fear and fear of dental pain; and (ii) both men and women are more willing to express their fearful feelings regarding dentistry using a more socially acceptable term.

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Dental fear is an important issue in the practice of dentistry because it interferes with both provision and receipt of dental care. Despite the advances in dental procedures, equipment, and anesthetic technology, self-reported dental anxiety levels have remained stable within the United States throughout the past 50 years (1). The most important etiologic factor of dental fear has been reported to be previous aversive dental experiences, including both the painful experiences and negative dentist contacts (2–6). A history of anxiety also predisposes people to the onset of dental fear (2, 6–8). Although the underlying constructs of dental fear and anxiety are certain to be multifactorial, fear of pain has been hypothesized to be a central component (9-12).

Gender is one of the most commonly reported factors in the extant literature that are associated with differences in dental fear. A consistent finding

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is that dental fear is more prevalent and severe among females than males (6, 12–16). However, the reasons underlying these gender differences in dental fear are not clear. Liddell and Locker (12) suggested that gender differences in dental fear might be due to the complex factors involved in men and women's attitudes toward pain and control. Eli et al. (17) noted that women remembered more pain after completion of dental treatment than men, and Locker et al. (5) reported that women tended to report more negative dental experiences than men.

The manner in which questions regarding dental fear are phrased may also play a role in an individual's report of his or her emotional experience. For example, Locker (8) found that many subjects thought it was foolish being fearful of dental treatment and, thus, tended to hide their fears from others to avoid ridicule. Moore et al.

(7, 18) also found that majority of the self-referred dental fear patients felt embarrassed about their dental fear problems. Therefore, the wording of questions could affect one's perception and admission of dental fear. People may be more likely to recognize and acknowledge their fear of dental treatment when the questions are asked in a manner which does not threaten or diminish the individual. To the best of our knowledge, no previous studies have investigated the issue of wording influence on self-reported dental fear. However, several studies conducted in other disciplines have shown that subtle wording change does affect people's reactions to the questions, especially when socially undesirable behaviors and opinions are probed. For example, one report explored the effect of question wording on adolescents' reports of health risk behaviors and found that when other factors are held constant, prevalence estimates varied according to different question wording (19). A survey on drug abuse revealed that participants who reported drug use behaviors felt more comfortable when they were inquired about how 'most people' would respond to the survey questions (projective approach) versus how 'you' would respond (subjective approach) (20). Another report showed that cancer patients' views on euthanasia and physicianassisted suicide (PAS) changed when different wording was chosen for the same questions (21).

There may be some interaction effects between gender roles and the expression of dental fear. In general, men and women differ in communication styles in the healthcare settings, with women being more expressive regarding their problems and feelings (22). A study conducted by Eli et al. (17) found that men showed significantly lower levels of dental anxiety than women, although they expected more pain before the treatment. Pierce and Kirkpatrick (23) pointed out that the traditional male gender role may lead men to express less fear than what they really feel. Unruh (24) also suggested that men decline to report pain because they feel more embarrassed by admitting pain than women because of social and cultural norms, and Holtzman (15) also proposed that gender differences in dental fear might merely reflect a response bias between men and women. However, other studies do not support the hypothesis that it is more socially acceptable for women to report fear, and therefore, that women are more willing to admit their dental fear and anxiety (3, 25).

The objectives of the present investigation were therefore to assess: (i) gender differences in reports of specific fear of dental pain, global fear of dental pain, and global dental fear; (ii) wording effects of questions about specific 'fear' or 'dread' of dental pain, and (iii) the interactions between gender differences and wording effects in the reports of specific fear of dental pain. One of the formal definitions of 'fear' in the English language is 'an unpleasant emotional state characterized by anticipation of pain or great distress and accompanied by heightened autonomic activity, esp. involving the nervous system', and 'dread' is a synonymous term in that sense (26). However, as perceived particularly by people in the United States, we hypothesized that 'dread' might be a more socially acceptable term than 'fear' when expressing anxious feelings related to dental care, and that, particularly for men, expressing 'dread' is more socially permissible, vis-à-vis appropriate gender reactions, than expressing 'fear' might be. Therefore, we hypothesized that: (i) females would be more likely to report dental fear and fear of dental pain than males; (ii) in general, people were more likely to admit 'dread' of specific dental painful events than 'fear' of; and (iii) males and females may respond differently to 'dread' versus 'fear' wording, with men being more likely than women to be differentially affected by wording.

Materials and methods

Sampling procedures

Data were collected from the monthly telephonic surveys conducted by the Survey Research Center in the Bureau of Economic and Business Research at the University of Florida. The sample was selected using random digital dialing techniques and covered approximately 500 households in the July 2004 cycle. Respondents were aged 18 years or older and were selected as the household member who most recently had a birthday. Telephone numbers were released as a percentage of the regional population (counties). Numbers of mobile cell telephone were excluded. Sampling continued until quotas for 500 were reached; 4750 telephone contacts were attempted and a total of 1322 respondents were eventually reached. Among them, 755 respondents refused to participate in the survey; 43 were not eligible; nine were physically or mentally unable to engage in a telephonic conversation; eight were unable or unavailable for miscellaneous reasons; three partially completed the survey; and finally, 504 respondents completed the survey, yielding an estimated response rate about 38% of the reached subjects. Informed consent of all subjects who participated in the investigation was obtained verbally during the call. The protocol was approved by the Institutional Review Board of the University of Florida.

Measures

Specific fear of dental pain

Specific fear of dental pain measures a number of fears related to specific painful dental events. In this study, it was assessed by six items from the Fear of Pain Questionnaire III (FPQ-III) (27) and the Fear of Dental Pain questionnaire (FDP) (28). The FPQ-III (27) is a 30-item self-report questionnaire designed to evaluate an individual's fear of a variety of painful events. Three subscales are derived including fear of severe pain, minor pain, and medical pain, comprising 10 items each. Four items in the FPQ-III are related to dental procedures and were included in the current study: 'receiving an injection in your mouth,' 'receiving stitches in your lip,' 'having a tooth pulled,' and 'having one of your teeth drilled.' The FDP (28) is an 18-item questionnaire which is designed specifically to measure fear of various types of dental pain. Two items ('receiving a root canal treatment' and 'a severe toothache') were selected from this questionnaire as additional measures of specific fear of dental pain. Items in FPQ-III and FDP are rated on a five-point Likert-type scale: 1, not at all; 2, a little; 3, a fair amount; 4, very much; and 5, extremely (27, 28).

These six items were selected from the two questionnaires because previous studies (4, 6, 29) found that they represented the moderate to severe painful dental stimuli expected by patients and were concomitant with the levels of dental anxiety. Face validity of these items has been demonstrated (27, 28). Internal consistency reliability was measured and found to be satisfactory (Cronbach's alpha 0.87).

The sample was randomly divided into two subgroups. The subjects in one group were asked to rate their 'dread' of these six dental painful events, while the subjects in another group were asked to rate their 'fear' of the same events. These groups are subsequently labeled the DREAD and FEAR groups.

Global fear of dental pain

Global fear of dental pain assesses the overall fearfulness of pain invoked in any type of dental

treatment. It was measured by a single-item question. Participants were asked if they 'strongly agree,' 'somewhat agree,' 'somewhat disagree,' or 'strongly disagree' with the statement 'I am afraid of dental visits because of possible pain.'

Global dental fear

Global dental fear refers to the overall fearfulness of dentistry. It was measured by the single item used by Gatchel (30), in which participants were asked to rate their fear of dentistry on a scale ranging from 1 (no fear) to 10 (extreme fear), with 5 indicating moderate fear.

Demographic variables and other variables

Data were collected on demographic and other variables: gender, age, Hispanic origin, race, education, household income, ability to pay an unexpected \$500 dental bill, and self-rated general health.

Statistical analysis

Descriptive analysis was conducted to illustrate the sample characteristics. Chi-squared tests were used to compare gender differences in reports of specific fear of dental pain, global fear of dental pain, and global dental fear. The original responses of the six items of specific fear of dental pain were on a fivepoint ordinal scale: 'not at all,' 'a little,' 'a fair amount,' 'very much,' and 'extremely.' Because our preliminary analyses indicated that some response categories had a very small number of subjects and were problematic for the analysis, we recoded all six items into dichotomous variables: 'not at all' and 'a little' were grouped as 'no' responses, and coded as '0'; and 'a fair amount,' 'very much,' and 'extremely' were grouped into 'yes' responses, and coded as '1.' The original measure of Gatchel's single dental fear item is on a scale ranging from 1 to 10 (30). Gatchel (30) and Locker (8) used a cut-off score of '8' to identify people who experienced significant degree of dental fear from people who experienced low level of dental fear. In accordance with their classification, subjects who scored 8 or more on the Gatchel scale were considered to belong to a high dental fear group, and who scored 1-7 were considered to be in a low dental fear group.

The differences in proportions detectable with 80% power were calculated for the observed sample size. At the 95% confidence level, using two-sided testing, and assuming that the group percentages are centered on 50% in order to

provide the most conservative estimate of power, the study sample would provide 80% power to detect a difference of proximate 13% between the study groups.

To test gender differences, wording effects and the interaction between gender and words simultaneously, a logistic regression analysis, which included gender, wording variable (coded 1, DREAD; 2, FEAR), and an interaction term of gender and wording variable as independent variables, was conducted for each of six specific measures of dental fear.

Results

Characteristics of subjects

A total of 504 adult respondents were interviewed. According to the 2004 American Community Survey (31), almost 52% of Florida's adult population (aged 18 years or older) are females, about 11% are young adults aged 18–24 years, and approximately 19% are Hispanic. About 42% of persons aged 18–24 years and 54% of persons aged 25 years or older have finished at least high school education. Compared with Florida's adult population, this sample was composed of a higher percentage of females and people who had completed at least high school education, and a lower percentage of young adults aged 18–24 years and Hispanics (Table 1).

There were no significant differences in gender, age, Hispanic origin, education, and household income for the DREAD and FEAR groups. However, the DREAD group had slightly more Blacks (13.4%) and fewer participants of other races (7.7%) than the FEAR group (6.8% and 10.8%, respectively).

Chi-squared test results

Table 2 indicates gender differences in reports of global dental fear and global fear of dental pain. Chi-squared analyses indicate that a higher percentage of females (17.4%) than males (10.4%) belonged to the high global dental fear group (P < 0.05). A higher percentage of females (18.3%) than males (9.1%) strongly agreed with the statement that they were afraid of dental visit because of possible pain, and a lower percentage of females (32.5%) than males (50.8%) strongly disagreed with the statement.

Table 3 indicates the gender differences in the six measures of specific fear of dental pain in the DREAD and FEAR groups. A significantly greater Table 1. Characteristics of the study sample and Florida's adult population

	Study sample (n = 504) (%)	Florida's adult population ^a $(n = 13\ 007\ 304)$ (%)				
Sex						
Male	40.3	47.8				
Female	59.7	52.2				
Age (years)						
18–24	5.7	11.1				
25–34	15.3	15.7				
35-44	18.0	19.2				
45-64	41.4	32.4				
≥65	19.6	21.6				
Ethnicity						
Hispanic	9.8	19.1				
Non-Hispanic	90.2	80.9				
Race						
White	80.6	77.5				
Black	10.1	15.1				
Other	9.3	7.4				
Education						
18–24 years (28)						
Secondary or less	46.4	58.2				
Post-secondary	53.6	41.8				
25 years and over (463)						
Secondary or less	32.8	45.8				
Post-secondary	67.2	54.2				
Household income						
≤19 999	19.2	21.5				
20 000-49 999	37.6	37.5				
50 000-99 999	30.7	28.4				
≥100 000	12.5	12.7				

^aAged 18 years or older.

percentage of females than males reported specific fear of dental pain. In the DREAD group, females were more likely to report dread of pain for each painful event than males, except for 'being drilled in a tooth.' Similarly, in the FEAR group, females were also more likely to report fear of pain for each painful event than males, except for 'having a tooth pulled.'

Logistic regression results in the analysis of gender and wording effects

Logistic regressions including gender, wording variable, and the interaction term of gender and wording variable showed that females were more likely to report fear of pain for each dental painful event than males (Table 4). Compared with subjects in the FEAR group, those in the DREAD group were more likely to report dreadful feelings toward all events except 'receiving an injection in your mouth.' The interaction term was significant for 'being drilled in a tooth' (P < 0.05), indicating that wording and gender interactively affected

Table 2. Gender differences in global fear of dental pain and global dental fear

Global fear measure	Male	Female	<i>P</i> -value ^a
Global fear of dental pain ('Being	afraid of dental visit because of	f possible pain')	
Strongly agree	18 (9.1)	54 (18.3)	< 0.001
Somewhat agree	42 (21.3)	59 (20.0)	
Somewhat disagree	37 (18.8)	86 (29.2)	
Strongly disagree	100 (50.8)	96 (32.5)	
Global dental fear (Gatchel's item)		
High fear (8–10)	21 (10.4)	52 (17.4)	0.031
Low fear (1–7)	180 (89.6)	247 (82.6)	

^aP-values derived from chi-squared tests

Table 3. Gender differences in specific fear of dental pain

	DREAD group $(n = 250)^{a}$		FEAR group $(n = 254)^{\rm b}$			
Specific fear of dental pain	Male, <i>n</i> (%)	Female, <i>n</i> (%)	<i>P</i> -value ^c	Male, <i>n</i> (%)	Female, N (%)	<i>P</i> -value ^c
Having a tooth pulled						
High fear	28 (29.2)	80 (53.3)	< 0.001	21 (20.2)	44 (29.7)	0.088
Low fear	68 (70.8)	70 (46.7)		83 (79.8)	104 (70.3)	
Receiving stitches						
High fear	30 (31.3)	98 (66.2)	< 0.001	19 (18.5)	78 (52.7)	< 0.001
Low fear	66 (68.7)	50 (33.8)		84 (81.5)	70 (47.3)	
Receiving an injection						
High fear	26 (27.7)	67 (44.7)	0.008	21 (20.4)	53 (35.8)	0.008
Low fear	68 (72.3)	83 (55.3)		82 (79.6)	95 (64.2)	
A severe toothache						
High fear	53 (56.4)	114 (75.5)	0.002	38 (37.3)	82 (55.8)	0.004
Low fear	41 (43.6)	37 (24.5)		64 (62.7)	65 (44.2)	
A root canal treatment						
High fear	56 (60.9)	109 (74.2)	0.031	48 (47.5)	100 (68.0)	0.001
Low fear	36 (39.1)	38 (25.8)		53 (52.5)	47 (32.0)	
Being drilled in a tooth						
High fear	55 (57.3)	87 (58.0)	0.913	32 (31.1)	78 (53.1)	0.001
Low fear	41 (42.7)	63 (42.0)		71 (68.9)	69 (46.9)	

^aThe cell sizes for each of the items in DREAD group do not add to the total number of participants (n = 250) because of missing values.

^bThe cell sizes for each of the items in FEAR group do not add to the total number of participants (n = 254) because of missing values.

^c*P*-values derived from chi-squared tests.

responses to this item. Men were more likely to admit feeling 'dread' of being drilled in a tooth than 'fear' of this event. However, females were not very much affected by the words. No interaction term for other five events showed significant differences, which means that the words 'dread' versus 'fear' affected males and females equally in their perceptions of fear of those events.

Discussion

Gender differences in dental fear have been of increasing interest among clinicians and researchers during the past years accompanying the efforts to improve patients' management and increase use of dental care services. It has been reported in previous studies that women report being more fearful in general and specifically more fearful of dental events than men (6, 12–16). The findings from the current study support these data. In our study, reported fear of pain for most of the specific dental events was more prevalent among females than males. A higher percentage of females than males were in the high dental fear group and strongly agreed with the statement that they were afraid of dental visit because of possible pain.

A number of explanations have been proposed for these differences. Liddell and Locker (12) suggested that gender differences in attitudes of both pain and perceived control might cause the gender differences in dental fear, as women not only reported more fear of pain, but also lower perceived capability of actual control. Gender

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Dependent variable (specific fear of dental pain)	Independent variable	Estimate	Odds ratio (95% confidence interval)	<i>P</i> -value
Having a tooth pulled	Intercent	0.75	_	<0.001
(1 = ves 0 = no)	Gender $(1 = male$	0.38	1 47 (1 20–1 80)	<0.001
(1 yes, 6 110)	2 = female	0.00	1117 (1120 1100)	0.001
	Wording $(1 = \text{dread},$	-0.37	0.69 (0.56-0.84)	< 0.001
	2 = fear			
	Gender × wording	0.13	1.14 (0.93–1.39)	0.218
Receiving stitches	Intercept	0.37	_	< 0.001
(1 = yes, 0 = no)	Gender $(1 = male,$	0.76	2.15 (1.75–2.63)	< 0.001
	2 = female)			
	Wording $(1 = \text{dread},$	-0.32	0.73 (0.60–0.89)	0.002
	2 = fear	0.02	0.07 (0.70, 1.18)	0 747
Dessiving on injection	Gender × wording	-0.03	0.97 (0.79–1.18)	0.747
$(1 - y_{0}) = y_{0}$	Condor (1 - malo	0.78	- 1.46 (1.20, 1.70)	<0.001
(1 = yes, 0 = no)	2 - female	0.38	1.40 (1.20–1.79)	<0.001
	2 = female Wording (1 = dread	-0.19	0.82(0.67-1.01)	0.061
	2 = fear	0.17	0.02 (0.07 1.01)	0.001
	Gender × wording	-0.01	0.99 (0.81–1.21)	0.939
A severe toothache	Intercept	-0.27	_	0.005
(1 = yes, 0 = no)	Gender $(1 = male,$	0.41	1.50 (1.24–1.81)	< 0.001
2	2 = female)			
	Wording $(1 = dread,$	-0.42	0.66 (0.55-0.80)	< 0.001
	2 = fear)			
	Gender × wording	0.03	1.03 (0.85–1.24)	0.766
A root canal treatment	Intercept	-0.54	—	< 0.001
(1 = yes, 0 = no)	Gender $(1 = male,$	0.37	1.44 (1.19–1.75)	< 0.001
	2 = female			
	Wording $(1 = \text{dread}, 2 + \text{foar})$	-0.21	0.81 (0.67–0.98)	0.032
	2 = 1ear	-0.06	$0.94 (0.78 \ 1.14)$	0 534
Being drilled in a tooth	Intercent	-0.00	0.94 (0.78-1.14)	0.334
(1 = yes, 0 = no)	Gender $(1 - male$	0.01	1 27 (1 05–1 53)	0.079
	2 = female	0.21	1.27 (1.00 1.00)	0.012
	Wording $(1 = dread)$	-0.32	0.72 (0.60-0.87)	< 0.001
	2 = fear			
	Gender × wording	-0.22	0.80 (0.67-0.96)	0.018
	0			

Table 4. Logistic regression results in the analysis of gender and wording effects in reports of specific fear of dental pain

differences are also exhibited in the prevalence of most specific fears and phobias (25, 32), and theories regarding the social transmission of fear and phobia and how it may contribute to the gender differences in specific fears and phobias (25) have been proposed. These hypotheses are also relevant to interpreting similar gender differences in dental fear.

We hypothesized that the choice of wording might affect the expression of dental fear, because social constraints regarding the permissibility of expressing fear could affect the perception and acknowledgement of dental fear. Our results partially supported the hypothesis. In the current study, a higher percentage of subjects were willing to report feeling 'dread' of specific dental painful events than 'fear' of these same events. We also hypothesized that there may be gender differences in the expression of fear, with men more willing to express feeling 'dread' than 'fear.' The data did not support this hypothesis, however, primarily because both women and men were willing to express 'dread' as regards the pain involved in possible dental procedures than to express 'fear' of these same events.

Our findings suggest that both men and women are more willing to express their fearful feelings regarding dentistry using a more socially acceptable term. On the other hand, it may be that the words, although treated as synonyms in the English language, have evolved to describe slightly different aversive situations. For instance, whereas 'dread' might be used generally to describe any unpleasant or painful experience, 'fear' might describe a further component that the aversive experience is unknowable, uncontrollable, or potentially life-threatening. Or, it is possible that dread may encompass the description of lower intensity aversive experiences such as those prompting dislike or nervousness, whereas fear may be more reserved for more intense aversive contexts. Regardless of the specific reason, because dental professionals play a crucial role in helping people to recognize and control over their fear of dental treatment, these data suggest that the manner in which questions are posed may greatly affect whether a healthcare professional recognizes dental fear in the clinic. Rather than asking patients about their fearfulness, it may be better to inquire regarding the degree of dread associated with an upcoming dental procedure, or dental care in general in determining whether this is a significant impediment to treatment and services in a specific patient.

Some limitations merit discussion. First, the issues of generalizability of the present study should be noted. Telephonic surveys using the random digital dialing technique usually exclude people who cannot afford telephone services and who are unable to engage in telephone discussions. Because the numbers of mobile cell telephone were excluded in the survey, people who had only mobile cell phone were not able to be recruited in this study. These issues may introduce sampling bias to our sample. Second, people may be afraid of some other specific pain-invoking dental events beyond the six procedures included in this study. We observed a significant gender-wording interaction effect in the report of specific fear/dread of 'being drilled in a tooth.' Other types of painful dental stimuli should be explored in the future investigations to better understand the issue of differential wording effects on males and females. In addition, other factors that may affect one's perception of dental fear, such as the the scope of individual dental experience, should also be taken into account in the future studies. Third, the results of the present study could only show that people were more responsive to the word 'dread' than the word 'fear.' However, we did not explore the underlying meaning of 'dread' and 'fear' that were perceived by this sample. Additional qualitative studies regarding this issue are merited.

In conclusion, we found that females were more likely to report dental fear than males, both females and males were more likely to report 'dread' of dental events than 'fear' of these events, and that men and women did not greatly differ in their use of these terms when describing dental fear and pain. The findings of this study are valuable in establishing effective strategies of patient's management. Because there is a lack of consistent and validated diagnostic criteria related to dental fear, this problem may be neglected by dentists when patients are reluctant to openly communicate. Dentists could be instructed to be especially alert to various manifestations of dental fear by patients who are unwilling to frankly admit their fear. Dentists should also choose less embarrassing wording to encourage people to express and cope with their dental fear. Because dental fear has been identified as a major obstruction to the seeking of dental care and a negative factor on oral health outcomes (8, 33-36), the ultimate goal of dealing with issues of dental fear is to increase the use of dental care services and improve oral health.

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