

Subjective well-being in dentists: the role of intrinsic aspirations

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Abstract – *Objectives:* To take a motivational approach, testing an idea derived
from self-determination theory (SDT) that the pursuit of intrinsic life and
professional aspirations is associated with enhanced subjective well-being.

Methods: A cross-sectional survey of a cluster sample of 583 dentists in England
provided data on the subjective importance of their intrinsic and extrinsic
aspirations and their perceived likelihood of achieving those aspirations. The
dependent variable was a four-domain measure of subjective well-being.

Results: Controlling measures of core self-evaluations and trait emotional
intelligence, the perceived importance and likelihood of achieving intrinsic
aspirations were uniquely related to positive affect; the perceived likelihood of
achieving intrinsic aspirations was uniquely related to job and life satisfaction
and positive affect, and the perceived likelihood of achieving extrinsic
aspirations was uniquely related to life satisfaction. No aspiration variables
uniquely predicted negative affect. *Conclusions:* These findings lend support to
self-determination theory and provide a platform for the future development of
interventions that can promote and maintain well-being in dentists.

Key words: aspirations; dental work force;
dentists; job satisfaction; motivation;
personality; values; well-being

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Compared with other occupational groups, dentists experience high degrees of stress, with their physical and psychological health poorer than that in the general population (1, 2). The human service nature of the work, heavy scheduling and relative isolation combine to make their work environment a demanding one (3, 4). Recently, researchers have shown that positive psychological states, such as job satisfaction (5–7) and work engagement (8–12), provide buffers against work stress. Most research on the predictors of these positive psychological states has focused on the quality of the work environment, that is, the physical, social and organizational aspects of the dental setting. Research with Dutch (13), Swedish (6) and Finnish (8, 9) dentists has shown that greater job control, in terms of skill, discretion and decision latitude, higher perceptions of trust within the workplace and positive interpersonal contacts

with patients and colleagues facilitate a positive experience of work.

Recent advances in organizational psychology show that well-being at work is not only influenced by job characteristics (termed job resources), but also personal resources such as personal agency, self-esteem and optimism (14). Personal resources are qualities that augment individuals' capacities to regulate their behaviour in ways that allow them to adjust to their environments and overcome challenges, promoting better resilience to stress (15). Personal resources and job resources are found to be mutually related, with both interacting reciprocally with well-being over time (14). It has been shown that positive self-evaluations predict goal setting, motivation, job performance, and job and life satisfaction (16). A complex interplay is thought to exist, where job and personal resources, positive emotions, work engagement and positive job

outcomes are all elements of a self-perpetuating, complex dynamic motivational process (14). Employee motivation therefore seems to be a key part of the process of generating well-being in the workplace. However, the structure of dentists' motivations has never been examined in the context of dentistry. To address this, we used self-determination theory (17) to examine the influence of motivational orientation on well-being in dentists.

Self-determination theory

Self-determination theory (SDT) (17) is a prominent approach to both personal and occupational well-being and performance (18–20). Self-determination theory postulates that well-being is fostered by a concordance between individuals' expressed motivations and three personal needs that are considered to be basic to personal functioning: autonomy, a sense of determining one's own life course; competence, the perception of being able to influence one's environment; and relatedness, the forming and maintenance of social bonds. Satisfaction of these three basic needs is positively related to employee well-being, engagement and job performance (19, 20). This notion has received some empirical support amongst dental practitioners. In Hakanen's 3-year study of Finnish dentists (9), job resources influenced future work engagement when they satisfied needs for autonomy, competence and relatedness see also (5, 6, 13).

According to SDT, human motivation differs in the degree to which it is driven by intrinsic or extrinsic goals (18). Intrinsically motivated behaviour is assumed to represent core aspects of the self, with people who engage in activities characterized by intrinsic motivation preferring tasks from which they derive interest or enjoyment. This interest and enjoyment is directly linked to the satisfaction of the three core needs of autonomy, competence and relatedness. Extrinsically motivated behaviour on the other hand is thought to be less related to inherent interests and core motives and driven by externally imposed influences such as rewards (e.g. to obtain money) or punishment avoidance. Self-determination theory postulates that goal content is associated with individuals' well-being. Pursuit and achievement of intrinsic goals, including self-acceptance (growth, autonomy, self-regard), affiliation (having a good relationship with friends and family) and community contribution, is seen as inherently rewarding because it is driven by basic human needs. Extrinsic

goals include financial success, image and social recognition (17). Extrinsic aspiration is not necessarily maladaptive. If freely chosen, extrinsic goals can provide a means towards the satisfaction of longer-term intrinsic needs (21). Rather, the focus is the balance between intrinsic and extrinsic motives, with enhanced well-being associated with activities that reflect proportionally greater intrinsic motivation.^a

Both intrinsic and extrinsic aspirations represent long-term goals tied to either intrinsic or extrinsic needs (18, 19). A positive balance of intrinsic relative to extrinsic aspirations can lead to enhanced well-being in two ways; pursuit of intrinsic goals is inherently rewarding and energizing, and people try harder to achieve intrinsic goals which improves the likelihood of their attainment (18). Typically, studies show that people place a greater importance on intrinsic than extrinsic aspirations and that intrinsic aspirations better predict well-being due to their inherent potential to facilitate need satisfying experiences such as the development of close relationships, community contributions and personal growth (19, 20). Whilst no work has previously examined dentists' well-being in relation to motivational factors, we note similarities between SDT and what Berthelsen et al. (22) describe as 'good work'. Their concept of 'good work' is rooted in a positive model of the psychosocial work environment, but is described as 'more comprehensive than concepts such as healthy work, job satisfaction and job engagement'. Their notion captures the energizing influence of positive human relationships and the joy of creating a piece of odontological handicraft. They do not, however, formally examine motivational structures.

Well-being

Studies of dentists normally use work-related indicators of well-being as outcome variables, but researchers in other areas of organizational psychology argue for the use of measures that examine experience beyond the workplace because well-being in the workplace is strongly related to well-being in general (23). Subjective well-being (SWB) is a broad construct referring to individuals'

^aWhen examining the effects of intrinsic or extrinsic motives, it is important to either obtain a ratio score or to statistically control the other. This eliminates the possibility that simply experiencing a motivated state, regardless of whether it is intrinsic or extrinsic, leads to enhanced well-being.

subjective evaluations about their quality of life and happiness (24). Subjective well-being predicts functioning over a range of life domains (e.g. work, relationships and leisure), (25). Subjective well-being has been widely used in psychology literature to measure positive aspects of mental health (24, 25) with previous studies showing associations between SWB and better performance in clinical and interpersonal work domains (25, 26). Subjective well-being has one cognitive component, life satisfaction, and two affective components positive and negative affect (24). Work-specific measures provide important contextual information, and best practice in organizational psychology research is to use both general and work-specific measures (23). Thus, we also included Ironson and colleagues' job satisfaction scale to assess dentists' general appraisal of their experiences in the workplace (27).

Study aim and hypotheses

Self-determination theory suggests that individuals' relative intrinsic aspiration forms a personal resource that enhances their professional and personal well-being. Whilst empirical support exists for an aspiration approach (19, 20), it has never been used with dentists and transferability cannot be assumed. Another problem is the existence of confounding variables. Personal resources as measured by trait emotional intelligence (trait EI) and core self-evaluations (CSE) have been previously found to predict well-being in dental students (28). These attributes are closely tied to intrinsic motivation (16, 29), forming potential confounds that should be statistically controlled.

A cross-sectional correlational study was conducted using a cluster random sample of dentists practicing in England. Self-rated confidence, competence, self-esteem and interpersonal ability were statistically controlled in all the analyses. Hypothesis 1 predicted that the importance of intrinsic aspirations will be uniquely associated with well-being after statistical control of the importance of extrinsic aspirations and the likelihood of extrinsic and intrinsic aspirations. Hypothesis 2 predicted that the perceived likelihood that intrinsic aspirations will be achieved will predict unique variance in well-being, controlling the importance of intrinsic and extrinsic importance and extrinsic likelihood. The final hypothesis was that intrinsic likelihood estimates would mediate or partly mediate the relationship between the importance of intrinsic aspirations and well-being. As it was unclear

whether extrinsic aspirations are potentially beneficial (although not to the same degree as intrinsic), neutral or potentially harmful, we did not make specific predictions concerning extrinsic aspirations.

Method

A cross-sectional self-report questionnaire was posted to a cluster random sample of primary care dentists working in England. Remuneration of publicly funded (National Health Service) general dental practitioners (GDPs) is based on contracts held at a local level between dental practices and primary care trusts (PCTs). Twenty of 152 PCTs in England were selected using randomization software. Two information sources were used to check representativeness of the selected PCTs. Data on mean dmft of 5-year-olds (from locally coordinated epidemiological studies) and population size of each PCT were checked against the national means and found to indicate a representative sample. Lists of GDPs and salaried dentists were obtained from commissioners and clinical directors of salaried services in each PCT, giving a sample size of 1199. Postal questionnaires were sent to all dentists on the sample list with a maximum of two postal reminders sent to nonresponders.

Ethical approval

Ethical approval for the study was obtained from the National Research Ethics Service (09/H1002/66) as well as National Health Service research governance approval from the 20 selected PCTs.

Participants

Response rate was 50% (601 of 1199 dentists). From these, eighteen respondents with more than 5% missing data on the SWB and Aspiration Index scales were eliminated from the study. The final sample consisted of 57% male and 43% female dentists. The mean age of the participants was 43.4 years (SD = 10.98). Twenty-four per cent of participants (128) were salaried dentists, with the remainder working in general dental practice. Of dentists working in general dental practice, the majority (261) worked under a mix of NHS and private dentistry arrangements; 162 GDPs worked under completely NHS arrangements, and 34 were engaged in providing dentistry on a completely private sector basis.

Measures

Aspiration. The Aspiration Index (30), used extensively in aspiration research, was used to measure intrinsic/extrinsic aspirations. The Aspiration Index scale is a 30-item nomographic inventory that measures six different goal domains. Intrinsic aspiration subscales are personal growth, community contribution and interpersonal relationships, and extrinsic subscales are wealth, fame and personal image. Using a 7-point Likert scale ranging from 1 (not at all important) to 7 (very important), participants rated each of the 30 items according to (i) 'how important this is to you' and (ii) 'given your current work situation, how likely is it that this will happen in your future'. Mean item scores were used for all analyses. Example items were 'To be a very wealthy person' (wealth domain) and 'To help others improve their lives' (community domain).

Personal resources. Core self-evaluations represent stable judgements representing 'fundamental premises that individuals hold about themselves and their functioning in the world' (16, 31). Core self-evaluations was measured using the 12-item CSES scale (31). The scale is based on four traits: self-esteem, locus of control, generalized self-efficacy and neuroticism. The first three refer to individuals' judgements of personal capability, whilst the latter refers to self-evaluations of emotional functioning. All items are scored on a 5-point Likert scale, ranging from 1 (not at all important) to 5 (very important). The scale items were summed (neuroticism was reversed coded). The Cronbach's alpha coefficient for CSES total score was $\alpha = 0.80$.

Trait emotional intelligence (trait EI) involves individuals' subjective evaluations of their abilities to understand and manage emotion (32). Trait EI is a predictor of subjective well-being (28, 29) because it contributes to successful coping (32) and goal setting (29). Trait EI was measured with the 'Trait Emotional Intelligence Questionnaire -Short Form' (32), consisting of 30-items responded to on a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree). The Cronbach's alpha reliability for the total trait EI scale was $\alpha = 0.86$.

Well-being. Our previous study (28) involving dental students, also using SWB as a dependent variable, showed that its various components (life satisfaction, positive and negative affect) was

differentially associated with predictor variables. Thus, we examined each component separately. The Satisfaction With Life Scale (33) is a 5-item scale assessing a global, cognitive assessment of life as a whole. Participants responded to on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item is 'I am satisfied with my life'. All five items were summed. The Cronbach's alpha reliability for this scale was $\alpha = 0.89$. Positive and negative affect were measured with the PANAS scale (34). The inventory consists of 10 positive (e.g. happy, joyful, pleased) and 10 negative (e.g. depressed, frustrated, angry) emotion adjectives. Participants are typically asked to indicate the extent to which they experience these adjectives in general, responding to a 5-point Likert scale ranging from 1 (very slightly/or not at all) to 5 (extremely). The scores of each factor were summed. Cronbach's alpha reliabilities for the PA and NA scales were $\alpha = 0.86$ and $\alpha = 0.88$, respectively.

Job satisfaction. To reflect the occupational context, we added the Job in General scale JIG, a measure of job satisfaction (27). The JIG scale shows convergent validity with other job satisfaction scales and good internal consistency (27). The JIG scale consists of 18 short adjectives evaluation feelings of own job. Example items are 'pleasant', 'poor', 'acceptable' and 'bad'. Participants responded to these short items using a three response format ('Yes', 'No' and 'Undecided'). The scale items were summed. The Cronbach's alpha coefficient for JIG was $\alpha = 0.88$.

Socio-demographics and practice-specific variables. Demographic variables, age and gender, as well as practice-specific information were obtained. Practice-specific questions included (i) whether dentists were principals, associates or vocational trainees, (ii) type of work place (community dental service, prison service, access centre, NHS practice, NHS/private practice or private practice), (iii) socio-economic area of the practice (rural, suburban, urban area), (iv) percentage of NHS/private mix and (v) whether practice is single-handed.

Analysis strategy

We first assessed possible demographic (age and gender) and practice (type of practice and practitioner status) variables that might confound any associations between aspirations and well-being. Univariate tests of all variables were conducted to

Table 1. Means and Standard deviations of study variables by age and gender

	Full sample Mean (SD)	Male <i>n</i> = 340	Female <i>n</i> = 254	Age				
				0–29 years <i>n</i> = 64	30–39 years <i>n</i> = 160	40–49 years <i>n</i> = 157	50–59 years <i>n</i> = 149	60+ years <i>n</i> = 40
Job satisfaction	13.44 (3.79)	13.29 (3.60)	13.64 (3.59)	14.00 (3.75)	13.71 (3.38)	13.16 (4.00)	13.12 (3.89)	14.45 (3.29)
Life satisfaction	25.24 (6.55)	25.06 (6.67)	25.49 (6.40)	26.39 (5.86)	25.71 (6.18)	24.59 (7.17)	24.40 (6.82)	27.08 (5.12)
Positive affect	37.07 (5.30)	36.94 (5.67)	37.26 (4.76)	38.25 (5.86)	37.49 (4.84)	36.21 (5.40)	38.65 (5.10)	38.85 (5.10)
Negative affect	21.78 (6.85)	21.43 (7.25)	22.24 (6.27)	21.38 (6.42)	21.30 (6.10)	22.11 (7.17)	21.14 (6.47)	21.59 (6.93)
Intrinsic importance	5.74 (0.78)	5.66 (0.84)	5.85 (0.69)	5.93 (0.59)	5.87 (0.66)	5.59 (0.89)	5.75 (0.80)	5.62 (0.85)
Extrinsic importance	3.27 (1.14)	3.14 (1.11)	3.45 (1.14)	3.92 (1.02)	3.45 (1.28)	3.01 (1.09)	3.00 (0.97)	3.32 (1.11)
Intrinsic likelihood	4.90 (0.96)	4.87 (0.99)	4.94 (0.92)	4.88 (1.03)	5.02 (0.88)	4.74 (0.98)	4.93 (0.99)	4.93 (0.92)
Extrinsic likelihood	3.13 (1.01)	3.16 (1.06)	3.09 (0.95)	3.54 (0.90)	3.20 (0.97)	2.96 (1.05)	2.96 (0.97)	3.22 (1.01)

rule this possibility out. Preliminary analysis also involved principal component analyses (PCA) to establish whether dentists' life goals fall, as proposed by Kasser and Ryan (30) into a two-factor solution of intrinsic and extrinsic goals.

Hypotheses 1 and 2 were tested using multiple regressions to test unique prediction of the four well-being variables by intrinsic importance and likelihood. Unique prediction would be indicated by significant standardized beta weights associated with intrinsic importance and likelihood. Hypothesis 3 proposed an indirect effect of intrinsic importance on well-being that is mediated by intrinsic likelihood. Our mediation analysis strategy was based on recommendations by Zhao et al. (35), who specify preconditions that the predictor (intrinsic importance) be linked to both the criterion (well-being) and the mediator (intrinsic likelihood) and that the mediator be linked to the criterion after statistical control of the predictor. Zhao et al. (35) do not require that these pretests be statistically significant, but we sought effects of some magnitude before testing the indirect effect because we wished to avoid the possibility of type 1 error through multiple significance testing. To estimate and test the indirect effect, we used a bootstrapping^b method (36). As with the regression analysis, CSE, trait EI and extrinsic importance and likelihood were controlled.

^bBootstrapping refers to the estimation of a population distribution using continuous sequential replacement resampling of the sample dataset. Bootstrapping requires no assumptions concerning the sampling distribution of the effect (36).

Results

Missing data constituted no more than 4% for any variable and were replaced using the SPSS multiple imputation procedure. Missing data were not replaced for either age or gender.

Factor analyses aspiration index

Two principal component analyses were undertaken: one for importance of the aspiration and the other for perceived likelihood of the aspiration. Similar to Kasser and Ryan (30), two factors with an eigenvalue greater than 1 were retained, with all six variables for the importance/likelihood scales loading neatly on two factors with factor loadings above 0.70. Consistent with past research (30), the two higher-order factors could be interpreted as representing dentists' intrinsic and extrinsic aspirations.

Preliminary analysis

Table 1 shows means and standard deviations of study variables. Consistent with previous research (30), dentists attached greater importance and likelihood ratings to intrinsic as opposed to extrinsic aspirations. Female dentists reported higher levels of both intrinsic ($F_{1,592} = 7.90, P < 0.01$) and extrinsic aspiration importance ($F_{1,592} = 10.89, P < 0.01$), but no gender differences were observed for other variables. Younger dentists reported higher levels of intrinsic ($F_{4,589} = 3.69, P < 0.05$) and extrinsic aspiration importance ($F_{4,589} = 11.23, P < 0.01$); whilst those aged 40–59 reported a lower likelihood of achieving extrinsic aspirations ($F_{4,589} = 5.25, P < 0.01$). Older dentists reported greater life satisfaction ($F_{4,589} = 2.49, P < 0.05$) and positive

affect ($F_{4,589} = 3.50, P < 0.01$). Age was negatively associated with aspiration importance and likelihood, but positively associated with well-being. As aspiration importance and likelihood were expected to positively predict well-being, we concluded that age cannot confound the research hypothesis and we did not statistically control it. Dentists working in salaried posts, NHS, private or combined practice settings did not differ across study variables. Dentists' position in the practice (principal/associate/vocational trainee) was also not related to study variables.

Preparatory to testing hypotheses, we computed a correlation matrix to examine univariate relationships between study variables (Table 2). Well-being components were only moderately intercorrelated, with correlations ranging from -0.37 to 0.47 , supporting the decision to examine them separately. Well-being was correlated with CSE and trait EI in the expected directions. Intrinsic and extrinsic importances were positively correlated with positive affect but not other well-being indicators. Intrinsic and extrinsic likelihood measures were positively correlated with job and life satisfaction and positive affect, and negatively associated with negative affect.

Hypotheses testing

Table 3 shows the standardized beta weightings and overall R^2 for the four multiple regression analyses. Standardized betas indicate unique variance in the criterion that is attributable to each predictor. Hypothesis 1 was partially supported, as intrinsic importance positively predicted positive affect, but was not related to other well-being outcomes. It is notable that, despite univariate tests showing no relationship between the two, intrinsic importance negatively predicted job and life satisfaction. This is attributable to a suppressor effect, where intrinsic importance suppresses error variance in another predictor variable with which it is correlated (37). Systematic deletion of variables in the analysis showed the true predictor to be intrinsic likelihood. Thus, intrinsic importance is not a true predictor of job or life satisfaction. Hypothesis 2 was also supported, as intrinsic likelihood was a unique positive predictor of job and life satisfaction and positive affect. Extrinsic likelihood predicted of job satisfaction. Neither intrinsic nor extrinsic likelihood predicted negative affect. We repeated all analyses in subgroups defined by age group, gender, type of practice and status within the practice. Findings were consistent across almost all

Table 2. Correlation matrix showing univariate relationships between study variables

	Life satisfaction	Positive affect	Negative affect	CSE	Trait EI	Intrinsic importance	Extrinsic importance	Intrinsic likelihood	Extrinsic likelihood
Job satisfaction	0.47**								
Life satisfaction		0.45**	-0.37**	0.41**	0.36**	0.05	0.02	0.43**	0.33**
Positive affect		0.47**	-0.43**	0.55**	0.50**	0.07	-0.01	0.47**	0.31**
Negative affect			-0.37**	0.53**	0.57**	0.33**	0.19**	0.48**	0.37**
Core self-evaluations (CSE)				-0.60**	-0.60**	0.04	0.07	-0.24**	-0.16**
Trait emotional intelligence					0.63**	0.04	0.02	0.38**	0.30**
Intrinsic importance						0.19**	0.00	0.41**	0.21**
Extrinsic importance							0.32**	0.49**	0.22**
Intrinsic likelihood								0.08	0.60**
Extrinsic likelihood									0.51**

** Significant at the 0.01 level (two-tailed).

Table 3. Standardized beta weightings and overall R^2 for the four multiple regression analyses of measures of well-being

	Job satisfaction	Life satisfaction	Positive affect	Negative affect
CSE	0.20**	0.29**	0.26**	-0.34**
Emotional intelligence	0.09	0.20**	0.30**	-0.41**
Intrinsic importance	-0.14**	-0.13**	0.16**	0.10
Extrinsic importance	-0.06	-0.07	0.08	0.06
Intrinsic likelihood	0.30**	0.30**	0.13**	0.01
Extrinsic likelihood	0.16**	0.10	0.08	-0.04
Overall R^2 (Adjusted)	0.281	0.411	0.465	0.455

** Significant at the 0.01 level (two-tailed).

subgroups, demonstrating that they were invariant to demographic or professional context.

To provide greater detail on specific aspiration domains, we examined the relevant domains where the overall aspiration proved a significant multivariate predictor. The three intrinsic importance domains (growth, community and relationships) were used to predict positive affect, the intrinsic likelihood domains were used to predict job and life satisfaction and positive affect, and the three extrinsic likelihood domains (fame, wealth and image) were used to predict job satisfaction. As previously, CSE, EI and all aspiration importance and likelihood domains were controlled. Job satisfaction was uniquely predicted by personal growth ($\beta = 0.39$, $P < 0.01$) and community likelihood ($\beta = 0.13$, $P < 0.05$) and by the likelihood of being wealthy ($\beta = 0.15$, $P < 0.01$). Life satisfaction was uniquely predicted by the likelihood of having successful relationships with others ($\beta = 0.21$, $P < 0.01$). Positive affect was uniquely predicted by community importance ($\beta = 0.3917$, $P < 0.01$) and the likelihood of personal growth ($\beta = 0.22$, $P < 0.01$).

Hypothesis 3: To identify possible meditational relationships, we used the analysis strategy described above. Analysis of Table 2 showed a univariate correlation between intrinsic importance and positive affect, but correlations between intrinsic importance and other well-being variables were so low as to conclude that meditational analysis

would not be successful (see Table 2). The table also shows a significant correlation between intrinsic importance and likelihood. Intrinsic likelihood and positive affect were correlated after controlling intrinsic importance. Thus, mediation between intrinsic importance and positive affect with intrinsic likelihood as the mediator is possible. To estimate the indirect relationship between intrinsic importance and positive affect, mediated by intrinsic likelihood, we used the SPSS bootstrapping macro provided by Preacher and Hayes (36). Five thousand bootstrapping resamples were performed to estimate the indirect effect with 95% confidence intervals. Core self-evaluations, EI and extrinsic importance and likelihood were controlled. These suggest that mediation is possible. The indirect effect was significant (0.028; 95% confidence intervals 0.005, 0.052), indicating the possibility of mediation. Mediation was partial, as the direct path remained significant (Fig. 1).

Discussion

We examined the idea that dentists' ratings of the importance of intrinsic aspirations and the subjective likelihood of their achievement are associated with greater well-being. Our findings showed both intrinsic importance and likelihood predicted well-being and did so consistently within differing

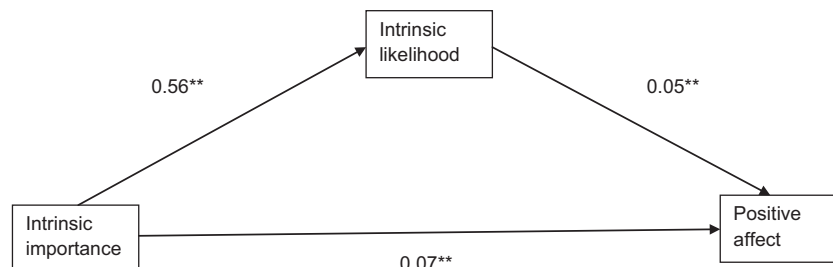


Fig. 1. Path analysis showing direct and indirect effects for the relationship between intrinsic importance, likelihood and positive affect. Note: Standardized path coefficients are presented in this figure.

demographic and professional groups. Simply placing importance upon intrinsic aspirations predicted positive affect. As extrinsic aspiration was statistically controlled, this finding does not merely reflect a general tendency towards aspiration. Similarly, we controlled CSE and trait emotional intelligence (trait EI), so this finding is unlikely to reflect a more general self-confidence or perceived competence in professional or personal domains. Rather, we interpret this in line with the SDT proposition that striving for intrinsic goals is self-rewarding (18), which implies that increasing striving for goals such as personal growth, community contribution and satisfying relationships will improve well-being even if the potential to achieve these is believed to be limited (19, 20, 30).

Perceptions that intrinsic aspirations are likely to be fulfilled were uniquely associated with positive affect and job and life satisfaction. Again, we do not attribute this to a generic sense of optimism or anticipation because extrinsic likelihood, CSE and EI were controlled. Similar to intrinsic importance, the perceived proximity of need satisfaction appears to be more powerful when aspirations are intrinsic rather than extrinsic. Intrinsic likelihood estimates appear to have mediated some of the effect of importance on positive affect. This provides some support for the SDT view that the priority that dentists afford to intrinsic goals brings those goals into proximity, possibly because they expend more effort and persistence in attempting to achieve them. We also provide some elaboration and support for Berthelesen et al. (22) concept of 'good work' by specifically linking job satisfaction and personal well-being to dentists' intrinsic motivations.

Unlike intrinsic likelihood, any benefits of intrinsic importance were confined to positive affect and do not appear to transfer to job or life satisfaction or the alleviation of negative affect. We suspect that this reflects fundamental differences in the ways in which satisfaction and affect act as indicators of well-being (28). Positive affect is a hedonic measure that captures feelings of pleasantness or excitement (34) and is immediately affected by day-to-day functioning. Job and life satisfaction refer to deliberative evaluations of one's current status on those domains (24, 27, 33) and are determined by the evaluation of progress towards long-term goals. Thus, aspirations that are intrinsically rewarding to pursue, but may not be fulfilled, might not hold as strong a weighting in life evaluations as they do in affective functioning.

It is also notable that no aspiration variables uniquely predicted negative affect. This may be partly attributed to their shared variance with CSE and EI, which were slightly stronger predictors of negative affect than other variables. However, this explanation does not fully hold because aspiration variables showed weaker univariate prediction of negative affect than of other well-being indicators (Table 2). Instead, we lean towards suggestions in the theoretical literature that aspirations, particularly intrinsic aspirations, are more important in the development of positive mental health states rather than the prevention of negative ones (19, 20).

There has been some discussion as to whether extrinsic motivations might be deleterious to well-being (21). We found no evidence to suggest that extrinsic aspirations pose any threat to well-being. Moreover, extrinsic aspirations uniquely predicted job satisfaction, largely due to the expectation of wealth. This is inconsistent with previous studies showing no benefit to extrinsic aspirations (19). We attribute this to the high relative importance of financial achievement in developing and running a successful practice and career. Whilst financial success may represent an extrinsic aspiration, it serves as both a means and a marker for conducting a successful clinical enterprise, and dentists may value it for that reason. We note, however, that any influence of the likelihood of wealth accumulation on well-being is smaller than that of intrinsic aspirations.

Limitations

Several limitations on the interpretation of these findings need to be considered. First, in contrast to the job engagement literature which is focused on work-related issues, this investigation pertains to factors that may influence the entirety of dentists' lives. This has the advantage that we can make a broader assessment of factors that influence well-being, but does not allow us as easily to discriminate between work and nonwork facets.

Another limitation is that the cross-sectional design does not allow us to make clear causal or mediational claims, and it may be the case, for example, that a sense of well-being causes people to choose intrinsic aspirations rather than vice versa. Further research involving a longitudinal study design is needed. A further limitation which should be considered is that all variables were measured using self-report instruments, and enhancement of our effects by social desirability responding and common method bias cannot be

eliminated. The response rate was low at 50%, although the profile of participants was similar to the national profile of dentists. It is possible that the characteristics of the 50% of nonrespondents may systematically differ from those of respondents on one or more study variables. Finally, the sample used in this study is English. Governance, remuneration arrangements as well as the cultural and societal context in which dentistry is practiced are relatively specific. Generalization to other cultures and health systems will therefore need to be considered carefully.

Research and practice implications

Our findings advance current understanding of the motivational processes involved in influencing dentists' psychological well-being and open up a new line of investigation and possible interventions. They show that dentists' intrinsic life aspirations are associated with well-being. These findings are consistent with the work engagement research which suggests that dentists desire challenge, autonomy and good interpersonal relationships (9) and points towards a motivational mechanism which is involved in linking job resources and work engagement. Further research work concerned with spiral gains and reciprocal relationships between job resources, personal resources and work engagement should include personal aspirations as a further factor which is involved in generating a cycle that determines dentists' successful adaptation to their work environment.

Our research raises the question as to whether well-being can be influenced by changes to work practices or is influenced by the fit between work practices and aspiration content. The SDT literature suggests that changing work practices in line with intrinsic motivations improves morale and performance (18), but we suspect that the answer to the question of fit may be complex. On the one hand, it appears sensible that dentists with wealth aspirations may prefer differing work environments to those with community aspirations. However, dentists in differing professional contexts did not show either great differences between intrinsic and extrinsic aspirations the ways in which aspirations predicted well-being. This invariance suggests that either fit may not be greatly important or that dentists find ways of manipulating (or making the best of) their work environments to suit their aspirations.

These findings emphasize the need to reconcile dentists' intrinsic aspirations with the constraints

of the delivery requirements of the health system. Whilst remuneration may be important, our findings suggest that dentists' primary concerns are intrinsic. In dental practice, opportunities for development of clinical skills may be relatively limited as the service is based on delivering generalist rather than specialist care. A service geared towards high turnover also constrains the amount of time spent interacting on a personal basis with patients and staff. Thus, it is important that policies that govern dentists' working conditions should note the potential negative consequences on well-being of such a system and attempt to strike a balance between financial imperatives and maintaining workforce morale. Another aspect of this problem involves supporting and assisting dentists to obtain intrinsic reward from current working practices. One aspect of practice that provides rewards is the existence of supportive professional relationships within practices, and there is evidence that the pursuit of this could be beneficial (5, 6). Fostering personal and professional links between practices may also be beneficial, in a system which is structured around individually owned practices, which in many health systems operate autonomously and compete against each other in a quasi-market environment.

Conclusions

We used a paradigm derived from social and organizational psychology research to examine well-being in dentists. Well-being is related to and may be caused by developing intrinsic life aspirations, and it is important to consider the need to maintain work environments that emphasize the development and achievement of these aspirations.

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