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Meditation has stronger relationships with mindfulness, kundalini, and mystical experiences than yoga or prayer

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ABSTRACT

Contemplative practices can have profound effects on mindfulness and on physical and sensory and mystical experiences. Individuals who self-reported meditation, yoga, contemplative prayer, or a combination of practices and their patterns of practice were compared for mindfulness, kundalini effects, and mystical experiences. The results suggest that the amount of practice but not the pattern and social conditions of practice influences mindfulness and possibly mystical experiences. Meditation, yoga, contemplative prayer, or a combination of practices all were found to be associated with enhancements of mindfulness, kundalini effects, and mystical experiences, but meditation had particularly strong associations and may be the basis of the associations of yoga and prayer with these outcomes. The results further suggest that the primary association of contemplative practices is with the real time awareness and appreciation of sensory and perceptual experiences which may be the intermediary between disparate practices and mindfulness, kundalini effects, and mystical experiences.

1. Introduction

Mindfulness has recently been recognized to be beneficial for health and well-being. It has been shown to improve mental health (Campanella, Crescentini, Urgesi, & Fabbro, 2014; Keng, Smoski, & Robins, 2011) and relieve stress (Sharma & Rush, 2014) in normal individuals and to be useful in the treatment of mental illnesses (Khoury et al., 2013; Khoury, Lecomte, Gaudiano, & Paquin, 2013; Lakhan & Schofield, 2013). It has also been shown to be beneficial for physical health (Kurdyak, Newman, & Segal, 2014; Obasi et al., 2013) and for the treatment of a multitude of physical ailments (Abbott et al., 2014; Merkes, 2010). Mindfulness has been shown to induce neuroplastic changes altering both the structure and activity of the nervous system (Fox et al., 2014; Hasenkamp, Wilson-Mendenhall, Duncan, Barsalou, 2012; Marchand, 2014). It has even been shown to delay physical and mental decline with aging (Gard, Hölzel, & Lazar, 2014; Schutte & Malouff, 2014). In addition, mindfulness has been employed with great benefit in schools (Zennerv et al., 2014), businesses (Aikens et al., 2014; Wolever et al., 2012), the armed forces (King et al., 2013), with police and firefighters (Smith et al., 2011; Williams, Ciarrochi, & Patrick Deane, 2010), and even in prisons (Himelstein, 2011; Sumter, Monk-Turner, & Turner, 2009).

The usefulness of mindfulness for the promotion of human flourishing has spawned a tremendous amount of scientific activity that has been accelerating over the last couple of decades (American Mindfulness Research Association & 1980 – 2013., 2015). The work has focused on the effects of mindfulness but there have been relatively few in depth

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investigations into the nature of the contemplative practices and methods that maximally facilitate mindfulness and its benefits. Contemplative practices as used here include a wide variety of practices that have the common thread of emphasizing first person real time awareness. These include meditation, yoga, contemplative prayer, mindful movements, etc.

A variety of contemplative practices have been found to increase mindfulness, including meditation (Eberth & Sedlmeier, 2012; Gard et al., 2014; Jacobs et al., 2011; Soler et al., 2014), yoga (Gard, Taquet, et al., 2014; Eastman-Mueller, Wilson, Jung, Kimura, & Tarrant, 2013), and mixed practices such as Mindfulness Based Stress Reduction (MBSR) (Carmody & Baer, 2008; Dobkin & Zhao, 2011; Sauer-Zavala, Walsh, Eisenlohr-Moul, & Lykins, 2013). The relationship of the amount and pattern of these practices that is optimal for increasing mindfulness is unclear. Carmody and Baer (2008) found that mindfulness increases with increasing amounts of practice while Dobkin and Zhao (2011) found that it was unrelated to amounts of formal practice. Soler et al. (2014) investigated the characteristics of meditative practice that were associated with heightened mindfulness. They found that frequency and life-time practice, but not session length or meditation type predicted higher levels of mindfulness. Clearly, there is a need to investigate the optimal patterns of practice to maximally increase mindfulness.

Contemplative practices can have other effects on the individual including the induction of physical symptoms and changes, often termed kundalini effects (Sanches & Daniels, 2008). These appear to be a consequence of contemplative practice involving changes in the energetics of the individual and the production of physical and sensory alterations (Thalbourne & Fox, 1999). These physical changes can be misinterpreted and diagnosed as anxiety or panic disorder (Thalbourne & Fox, 1999). Kundalini effects were first described in the yogic traditions going as far back as the Upanishads, commentaries on the Hindu scriptures, the Vedas (Krishna, 1993) but have also been recognized in the meditation (Wilber, 1996) and prayer communities (Underhill, 1995). Sanches and Daniels (2008) developed a Kundalini Awakening Scale in order to begin systematic investigations of the kundalini effects. They demonstrated heightened kundalini effects in yoga practitioners and a mixed group of contemplative practices. Unfortunately, with the exception of Sanches and Daniels (2008) and Thalbourne and Fox (1999) there has been relatively little systematic research into kundalini effect. Clearly there is a need for empirical research into the kinds of practices and the pattern of practice that have the greatest impact on these effects.

Contemplative practices also can induce mystical, spiritual experiences that can have powerful effects on the individual (Büssing, Hedtstück, Khalsa, Ostermann, & Heusser, 2012; Hood, 2006; Prakash & Caponigro, 2009; Travis, 2014). These types of effects are reported in many different traditions employing a variety of practices including a variety of yoga, meditation, and prayer techniques (James, 1916; Stace, 1960). In comparison to kundalini effects there's been a considerable amount of empirical research on these mystical experiences. Hood (1975) developed a Mysticism Scale to measure the characteristics of these experiences. Applying factor analytic techniques he detected two major factors, a general mystical experiences factor and an interpretative factor. Further analysis employing larger and more diverse samples produced a three-factor structure of Introvertive Mysticism, Extrovertive Mysticism, and Interpretation. Subsequent research generally replicated the basic three-factor structure (Chen, Qi, Hood, & Watson, 2011; Chen, Zhang, Hood, & Watson, 2012; Hood, 2006). In the extrovertive mystical experiences all perceptual phenomena are viewed as coming through the senses as one while the introvertive type is devoid of all sensory imagery viewing instead everything as pure consciousness. "The essential difference between them is that the extrovertive experience looks outward through the senses, while the introvertive looks inward into the mind" (Stace, 1960, p. 61). Unfortunately, again there has been little or no systematic research into the kinds and pattern of practices that produce and have the greatest impact on mystical, spiritual experiences.

The present study attempts to develop and expand upon the prior research by comparing the relative associations of meditation, yoga, contemplative prayer, and a combination of practices with mindfulness, kundalini effects, and mystical experiences. These three were chosen to represent the variety and breadth of changes that have been associated with contemplative practices. Additionally, the patterns of practice that are most highly related to these outcomes were also investigated. Mindfulness practitioners who self-reported their current contemplative practices and their patterns of practice were compared on their levels of five different aspects of mindfulness, observing, describing, acting with awareness, non-judging, non-reacting, as measured by the Five of Mindfulness Questionnaire (FFMQ, Baer et al., 2008). They were also assessed with the Kundalini Awakening Scale (KAS, Sanches & Daniels, 2008) for physical changes and the Mysticism Scale (MYST, Hood, 1975) for awakening experiences.

2. Methods

2.1. Participants

Participants were recruited from students at Sam Houston State University for the Contemplative Practices and Mindfulness Development Study to investigate the relationship between contemplative practices and the development of mindfulness, gratefulness, satisfaction with life, and awakening. They participated to partially fulfill a course requirement. Participants were also recruited from the general population who volunteered in response to advertisements in mindfulness oriented magazines, through word of mouth, snowball sampling, and social media. Outside participants were recruited to help with scientific research for developing understanding about mindfulness and awakening by participating in the Mindfulness and Awakening Research Registry (MARR, http://www.contemplative-studies.org/views/MARegistry.php). Their participation was entirely voluntary and they did not receive rewards or inducements for participation. The study protocol was approved by the Sam Houston State University Institutional Review Board.

There were a total of 715 participants, 76.6% female, 9.6% were from outside the university. They averaged in age 23.8 yrs. (σ = 8.9, range 18–79) and in education 14.2 yrs. (σ = 2.24, range 12–29). They practiced meditation (18.0%), yoga (23.2%), prayer (36.8%) and a combination of multiple practices (10.6%) and 11.3% did not have a contemplative practice. Those who practiced had been practicing for an average of 5.7 y (σ = 6.21 range 3 mos. – 41 yrs.).

2.2. Measures

2.2.1. Demographics

Participants completed a demographics questionnaire, requesting age, sex, body size, and years of education.

2.2.2. Contemplative practices questionnaire

Participants completed a contemplative practices questionnaire, requesting information on the nature of their current contemplative practice(s), history, amounts and frequency of practice, social conditions, and engagement in practice retreats. They indicated what type of practice they engaged by checking the type from the list, meditation, yoga, contemplative prayer, mindfulness based stress reduction, tai chi or qigong, other (e.g. astral projection, meditation with music, energy work, body scan, dance, etc.). If they had more than one practice, the participants were asked to fill out one contemplative practices questionnaire for each practice.

2.2.3. Five-Facet Mindfulness Questionnaire, FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Baer et al., 2008)

The 39-item self-report measure of mindfulness is composed of five subscales: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. Participants responded to questions (e.g. "I watch my feelings without getting lost in them") on a 5-point Likert-type scale, from 1 (never or very rarely true) to 5 (very often or always true).

2.2.4. Kundalini Awakening Scale (KAS; Sanches & Daniels, 2008)

The 76-item self-report measure of kundalini effects is composed of five subscales: changes, involuntary positionings, physical symptoms, negative experiences, and positive experiences. Participants responded to questions (e.g. "I've been aware of a blissful sensation in all my nerves.") on a 7-point Likert-type scale, from 1 (strongly agree) to 7 (strongly disagree).

2.2.5. Mysticism Scale (MYST; Hood, 1975)

The 32-item self-report measure of mystical experiences is composed of three subscales: introvertive mystical experiences, extrovertive mystical experiences, and interpretation. Participants responded to questions (e.g. "I have had an experience in which everything seemed to disappear from my mind until I was conscious only of a void.") on a 5-point Likert-type scale, from 1 (This description is probably true of my own experience or experiences) to 5 (This description is definitely not true of my own experience or experiences).

2.3. Procedure

Participation occurred completely on-line at the Mindfulness and Awakening research Registry (MARR, http://www.contemplative-studies.org/views/MARegistry.php). Participants viewed a statement regarding the rationale for the study and were directed to an informed consent page. After providing informed consent the participants were required to complete a demographic information questionnaire, the Five Facets of Mindfulness Questionnaire, FFMQ), the Kundalini Awakening Scale (KAS), and the Mysticism Scale (MYST). If they indicated on the demographics questionnaire that they engage in a contemplative practice they were asked to complete the contemplative practices questionnaire for each practice. If they answered that they did not have a contemplative practice, they were classified as having "no contemplative practice." If any of the required information was not completed, was entered improperly, or was incomplete or confusing, the participants received an email detailing the necessary corrections. Participants were directed to log into the system again and complete the missing or confusing entries. Credit was not issued until all required information had been entered satisfactorily.

2.4. Data analysis

All MARR entries were recorded into a data-base. Participants were separated based upon their self-identified current contemplative practice into no-practice, meditation, yoga, contemplative prayer, and multiple practices groups. Participants also indicated Mindfulness Based Stress Reduction (MBSR). It was discovered, however, that the nature of MBSR practice was not understood by many. As a result, MBSR practice was not considered. Participants also indicated other practices such as qigong, astral projection, meditation with music, energy work, body scan, and dance, but these practices were too infrequent to analyze and were thus not included in the analysis. To be included in the multiple practices group the participants must have listed and provided the history and details regarding more than one contemplative practice. Of the multiple practices participants 90% indicated two different practices, 9% three practices, and 1% four practices. Of the multiple practices 68% included meditation, 67% Yoga, 34% prayer, and 31% other practices.

Responses on each of the five subscales of the FFMQ, observing, describing, acting with awareness, non-judging, non-reacting were analyzed. In addition, a total FFMQ score was calculated as the average of the five subscale scores and analyzed. Responses on each of the five subscales of the KAS, changes, involuntary positionings, physical symptoms, negative experiences, and positive experiences were analyzed. In addition, a total KAS score was calculated as the average of the five subscale scores and analyzed. Responses on each of the three subscales of the MYST, introvertive mystical experiences, extrovertive mystical experiences, and interpretation were analyzed. In addition, a total MYST score was calculated as the average of the three subscale scores and analyzed. To allow for easy comparisons across scales and subscales, the scores and subscales of the FFMQ, KAS, and MYST were calculated as the average item response for each.

The characteristics of each current practice were measured by the participants' self-reports of the number of years and months that they've been practicing, the average number of minutes that they engage in each their practices, how often per day, and how many days per week, and the percentage of their practice sessions that occurred alone or in a group.

Responses were analyzed employing SPSS ver. 20 (IBM Corporation). Groups were compared for their responses on the FFMQ, KAS, and MYST with General Linear Model MANOVA followed by Fisher's Least Significant Difference post hoc tests. A number of multivariate tests of significance were calculated including Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root. Amounts of practice and practice techniques relationships with the FFMQ scores were analyzed with Multiple Linear Regression.

3. Results

3.1. Practice group differences on the total scores for the FFMQ, KAS, and MYST

The mean scores for the total FFMQ, KAS, and MYST scale scores for the four contemplative practice groups and the no-practice group are presented in Fig. 1. All multivariate tests were significant ($p < .001$). Significant differences were present between the groups for the total FFMQ, $F(4,683) = 15.99$, $p < .001$, the total KAS, $F(4,683) = 17.29$, $p < .001$, and the total MYST, $F(4,683) = 11.93$, $p < .001$. Post hoc tests revealed that the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than no-practice, yoga, and prayer groups for all three scales. The yoga and prayer groups did not significantly differ but both had significantly higher scores than the no-practice group, except for the KAS score for the prayer group and the MYST score for the yoga group, and significantly lower scores on all of the scales than both the meditation and multiple practice groups. It appears that the high scores for multiple practices on the FFMQ and MYST were due to the meditation component within the multiple practices. When those multiple practices that contained meditation were compared to those that did not the scores on the FFMQ and MYST were significantly higher, $t(74) = 2.29$; 2.11, $p < .05$ respectively). Similar analyses for yoga and prayer did not reveal significant differences.

The univariate correlations and scatter plots of the relationships between the three scales and meditation (Fig. 2), Yoga (Fig. 3) and Prayer (Fig. 4) reveal the same pattern of relationships seen in the multivariate analyses in a more concrete way. Hence, any form of practice appears be associated with higher scores on all three scales, while meditation and multiple

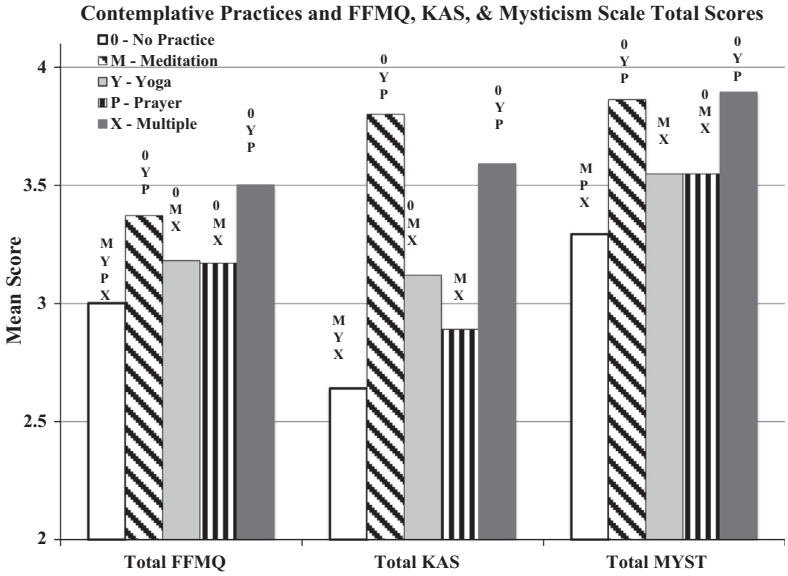

Fig. 1. Mean total scores for FFMQ (left), KAS (center), and MYST (right) for the no-practice, meditation, yoga, prayer, and multiple practice groups. The letters above the bars indicate a significant ($p < .05$) difference between the mean represented by the bar and the mean for no-practice (0), meditation (M), yoga (Y), prayer (P), or multiple practices (X).

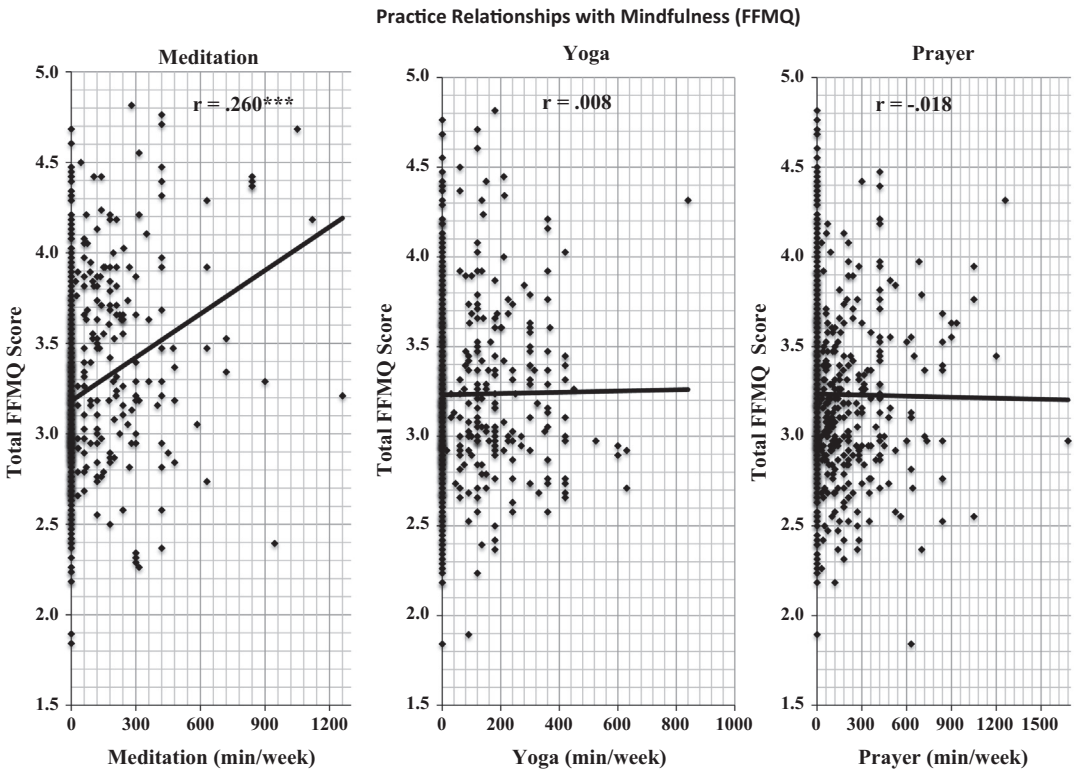

Fig. 2. Scatter plots for the relationships between the individual's FFMQ score and the minutes per week of meditation (right), yoga (center), and prayer (right). Included are the best fitting line for the regression and the correlation coefficient for each relationship. *** $p < .001$, ** $p < .01$, * $p < .05$.

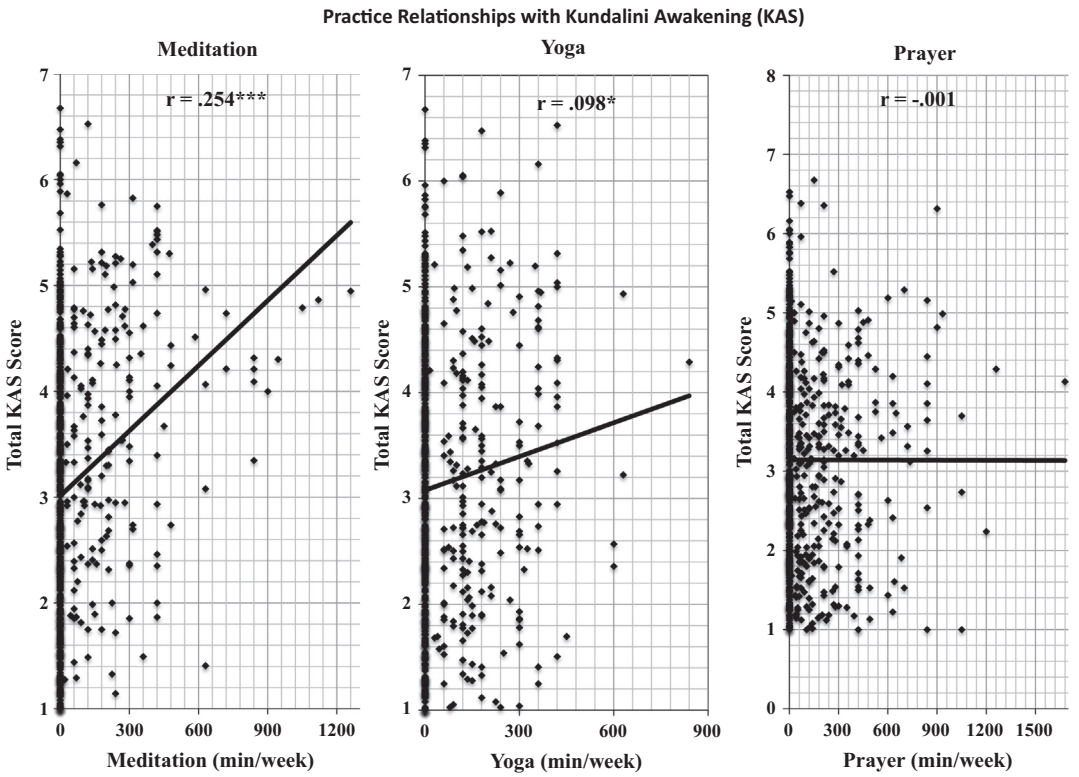

Fig. 3. Scatter plots for the relationships between the individual's KAS score and the minutes per week of meditation (right), yoga (center), and prayer (right). Included are the best fitting line for the regression and the correlation coefficient for each relationship. *** $p < .001$, ** $p < .01$, * $p < .05$.

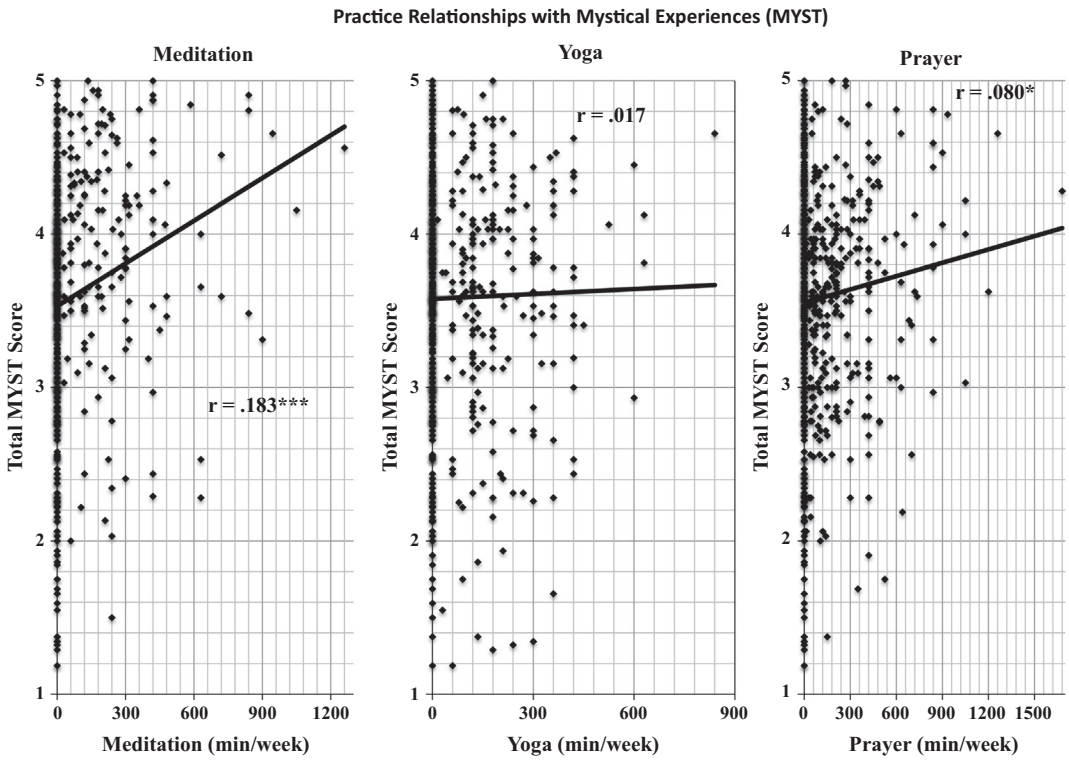

Fig. 4. Scatter plots for the relationships between the individual's MYST score and the minutes per week of meditation (right), yoga (center), and prayer (right). Included are the best fitting line for the regression and the correlation coefficient for each relationship. *** $p < .001$, ** $p < .01$, * $p < .05$.

practices are associated with higher scores than yoga or prayer and the higher scores for multiple practices appear to be due to meditation contained in the multiple practices.

3.2. Practice group differences on the five facets of mindfulness subscales

The mean scores for the five FFMQ subscales for the practice groups are presented in Fig. 5. All multivariate tests of significance were significant ($p < .001$). Significant differences were present between the groups for the all five FFMQ subscales, $F(4, 708) = 22.62$; 6.52; 6.26; 8.85, $p < .01$ for the observing, describing, non-judging, and non-reacting subscales respectively, and 3.14 $p < .05$ for acting with awareness. The same pattern of practice type relationships with the scores that were present for the overall FFMQ scores were also apparent to a lesser or greater extent with each of the subscales.

For the observing subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than no-practice, yoga, and prayer groups. The yoga and prayer groups did not significantly differ but both had significantly higher scores than the no-practice group. For the describing subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than no-practice, yoga, and prayer groups. The yoga and prayer groups did not significantly differ while the prayer group had significantly higher scores than the no-practice group. For the acting with awareness subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than no-practice group. The yoga and prayer groups did not significantly differ while the prayer group had significantly higher scores than the no-practice group. For the non-judging subscale the multiple practice group had significantly higher scores ($p < .01$) than no-practice meditation, yoga, and prayer groups. The meditation and yoga groups did not significantly differ while the both had significantly higher scores than the no-practice group. Finally, for the non-reacting subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than no-practice, yoga, and prayer groups. The no-practice, yoga and prayer groups did not significantly differ.

3.3. Practice group differences on the kundalini awakening subscales

The mean scores for the five KAS subscales for the practice groups are presented in Fig. 6. All multivariate tests of significance were significant ($p < .001$). Significant differences were present between the groups for the all five KAS subscales, $F(4, 706) = 20.87$; 8.35; 7.88; 14.10, $p < .001$ for the changes, physical symptoms, negative experiences, and positive experiences subscales respectively, and 2.75, $p < .05$ for involuntary positionings. In general, the same pattern of practice type

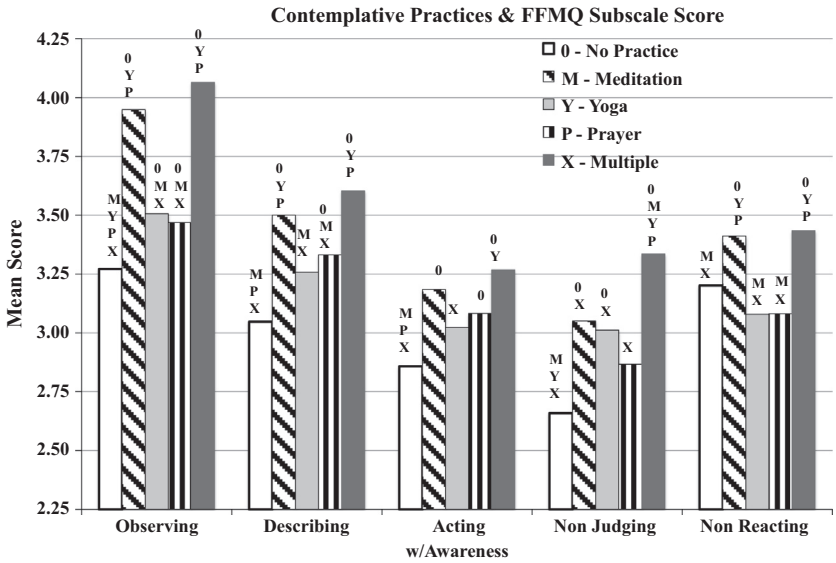

Fig. 5. Mean scores for FFMQ subscales observing (left), describing (left center), Acting with Awareness (center), non-judging (right center) and non-reacting (right) for the no-practice, meditation, yoga, prayer, and multiple practice groups. The letters above the bars indicate a significant ($p < .05$) difference between the mean represented by the bar and the mean for no-practice (0), meditation (M), yoga (Y), prayer (P), or multiple practices (X).

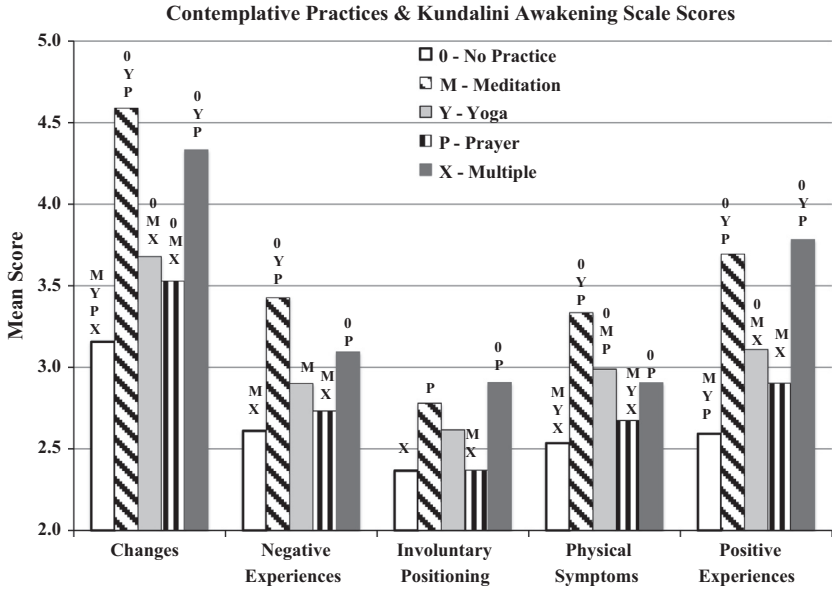

Fig. 6. Mean scores for KAS subscales changes (left), negative experiences (left center), involuntary positioning (center), physical symptoms (right center) and positive experiences (right) for the no-practice, meditation, yoga, prayer, and multiple practice groups. The letters above the bars indicate a significant ($p < .05$) difference between the mean represented by the bar and the mean for no-practice (0), meditation (M), yoga (Y), prayer (P), or multiple practices (X).

relationships with the scores that were present for the overall KAS scores were also apparent to a lesser or greater extent with each of the subscales.

For the changes and negative experiences subscales the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than no-practice, yoga, and prayer groups. The yoga and prayer groups did not significantly differ but both had significantly higher scores than the no-practice group. For the involuntary positionings subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than prayer group. The no-practice, yoga, and prayer groups did not significantly differ while the prayer group had significantly lower scores than the meditation group. For the physical symptoms subscale post hoc tests revealed that the multiple practice group had significantly higher scores ($p < .01$) than no-practice and prayer groups, while the meditation

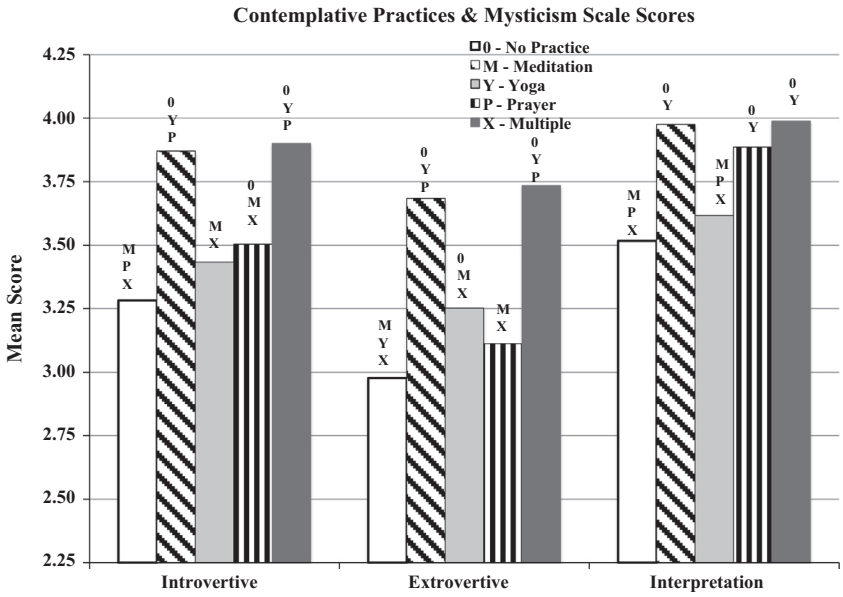

Fig. 7. Mean scores for MYST subscales introvertive mystical experiences (left), extrovertive mystical experiences (center), and interpretation (right) for the no-practice, meditation, yoga, prayer, and multiple practice groups. The letters above the bars indicate a significant ($p < .05$) difference between the mean represented by the bar and the mean for no-practice (0), meditation (M), yoga (Y), prayer (P), or multiple practices (X).

group had significantly higher scores than the yoga and prayer groups. The no-practice and prayer groups did not significantly differ. Finally, for the positive experiences subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .01$) than no-practice, yoga, and prayer groups. The yoga and prayer groups did not significantly differ but the yoga group had significantly higher scores than the no-practice group.

3.4. Practice group differences on the mysticism subscales

The mean scores for the three MYST subscales for the practice groups are presented in Fig. 7. All multivariate tests of significance were significant ($p < .001$). Significant differences were present between the groups for the all three MYST subscales, $F(4,706) = 10.39$; 14.69; 9.03, $p < .001$ for the introvertive, extrovertive, and interpretation subscales respectively. In general, the same pattern of practice type relationships with the scores that were present for the overall MYST scores were also apparent to a lesser or greater extent with each of the subscales.

For the introvertive subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .001$) than no-practice, yoga, and prayer groups. The yoga and prayer groups did not significantly differ but the prayer group had significantly higher scores than the no-practice group. For the extrovertive subscale the meditation and multiple practice groups did not significantly differ but both had significantly higher scores ($p < .001$) than no-practice, yoga, and prayer groups. The no-practice, yoga and prayer groups did not significantly differ but the yoga group had significantly higher scores than the no-practice group. For the Interpretation subscale the meditation, prayer, and multiple practice groups did not significantly differ but all three had significantly higher scores ($p < .01$) than the no-practice and yoga groups.

3.5. Relationships between practice characteristics and FFMQ, KAS, and MYST Scores

The results of the multiple regression analysis of the amount of meditation, yoga, and prayer practice (hours/week), the participant gender, years of practice, frequency of practice (sessions/week), and percentage practicing alone and the total FFMQ and five subscales, total KAS and five subscales, and total MYST and three subscales are summarized with standardized regression coefficients (β coefficients) in Table 1.

The regressions predicting the total FFMQ and subscale scores were highly significant ($p < .001$). Of the three practice types the amount of meditation practice had the largest significant associations with mindfulness for the total and all subscales except describing ($p < .01$) while the amount of yoga and prayer practice were not significantly related to any of the FFMQ scores. For the practice characteristics, years of practice was significant for the total FFMQ scores and all five subscales ($p < .05$). The frequency of practice variables was significantly negatively related to the total and non-reacting FFMQ scores while practicing alone was significantly positively related to the observing score only.

The participant gender was significantly negatively related to total FFMQ score and the observing and non-reacting subscale scores implying higher scores for males. These were the only significant gender effects observed in the study. They

Table 1
Standardized regression coefficients (β coefficients) for the multiple regressions predicting mindfulness (top), kundalini effects (middle) and mystical experiences (bottom) on the basis of the practice types and characteristics.

	Five Facets of Mindfulness Scale (FFMQ)					
	Total	Observing	Describing	Acting	Non-judging	Non-reacting
Meditation (min/wk.)	.242***	.212***	.069	.127**	.130**	.199***
Yoga (min/wk.)	.081*	.077	.008	.006	.075	.078
Prayer (min/wk.)	.033	.038	.021	.032	−.037	.064
Gender (1 = ♂, 2 = ♀)	−.105**	−.096*	−.068	−.055	.048	−.198***
Practice years	.270***	.093*	.195***	.148***	.209***	.151***
Sessions/week	−.099*	−.035	−.021	−.069	−.069	−.106*
% Practice alone	.025	.089*	−.016	−.029	−.008	.054
r	0.382	0.288	0.220	0.203	0.253	0.337
F(10,317)	15.07***	7.95***	4.47***	6.63***	6.02***	11.25***

	Kundalini Awakening Scale (KAS)					
	Total	Changes	Negative experiences	Involuntary positioning	Physical symptoms	Positive experiences
Meditation (min/wk.)	.265***	.299***	.177***	.099*	.171***	.248***
Yoga (min/wk.)	.107**	.087*	.092*	.117**	.128**	.111**
Prayer (min/wk.)	.121**	.136**	.062	.021	.073	.133**
Gender (1 = ♂, 2 = ♀)	−.064	−.058	−.055	−.067	−.053	−.069
Practice years	−.031	−.004	−.082*	−.084*	−.069	−.007
Sessions/week	−.120**	−.114*	−.088	−.048	−.126**	−.085
% Practice Alone	.114**	.100*	.096*	.071	.115**	.099*
r	0.319	0.331	0.254	0.215	0.275	0.298
F(10,317)	9.91***	10.85***	6.06***	4.26***	7.17***	8.55***

	Mysticism scale			
	Total	Subscales		
		Introvertive	Extrovertive	Interpretation
Meditation (min/wk.)	.197***	.196***	.213***	.125***
Yoga (min/wk.)	.034	.042	.088*	−.033
Prayer (min/wk.)	.127**	.133**	.015	.172***
Gender (1 = ♂, 2 = ♀)	−.030	-.055	−.017	−.002
Practice years	.085*	.054	.094*	.082
Sessions/week	−.083	−.099*	−.083	−.037
% Practice alone	.005	−.002	.043	−.021
r	0.217	0.212	0.251	0.215
F(10,317)	4.23***	4.01***	5.75***	4.14***

* $p < .05$.
** $p < .01$.
*** $p < .001$.

resulted from a relatively high representation of males in the meditation group, 42.2%, which had relatively high scores on the FFMQ and a low representation of males in the yoga group which had relatively low scores on the FFMQ, 12%. Similarly, Quilty, Saper, Goldstein, and Khalsa (2013) found 14% of yoga participants as male.

The regressions predicting the total KAS and subscale scores were all highly significant ($p < .001$). Of the three practice types the amount of meditation practice had the largest associations with the Kundalini Awakening scores ($p < .05$). The amount of yoga practice had moderate associations with the total and all subscales ($p < .05$) while the amount of prayer practice had smaller associations with the total and the changes and positive experiences subscales ($p < .05$). The participant gender was not significantly related to the KAS scale scores. For the practice characteristics, years of practice was negative and marginally significant for the total negative experiences and involuntary positioning subscales ($p < .05$). The frequency of practice variables was significantly positively related to the total and all subscales except involuntary positioning scores.

The regressions predicting the total MYST and subscale scores were highly significant ($p < .001$). Of the three practice types the amount of meditation practice had the largest associations with the mysticism scores with the standardized regression coefficients (β coefficients) significant for the total and all subscales ($p < .001$). The amount of yoga practice had a small associations with extrovertive mysticism ($p < .05$) while the amount of prayer practice had moderate associations with the total score and introvertive mysticism and interpretation subscales ($p < .01$). The participant gender and practicing alone were not significantly related to the MYST scale scores. For the practice characteristics, years of practice was only marginally significant for the total score and the extrovertive subscale ($p < .05$). The frequency of practice variables was significantly negatively related only to the introvertive subscale score.

4. Discussion

It was quite striking that regardless of the measurement, mindfulness, kundalini effects, or mystical experiences, meditation and multiple practices were associated with higher scores than no-practice, yoga, or prayer. This was true for the total scores on the scales and for the most part on all of their subscales. These findings are similar to those reported in a number of studies involving mindfulness (Jacobs et al., 2011; Soler et al., 2014), kundalini effects (Sanches & Daniels, 2008), or mystical experiences (Carmody, Reed, Kristeller, & Merriam, 2008; Crescentini, Urgesi, Campanella, Eleopra, & Fabbro, 2014; Geary & Rosenthal, 2011; Greeson et al., 2011; Travis, 2014). The results are quite clear, all practices are associated with greater mindfulness, kundalini effects, and mystical experiences, but meditation and multiple practices are the highest.

Meditation and multiple practices were associated with higher scores and for the most part did not significantly differ. But, the analyses suggest that meditation may be primary. The higher scores for multiple practices on both mindfulness and mystical experiences appear to be due to the meditation contained in the multiple practices. The overall higher association of meditation with all three measures was also reflected in the facts that only the amount of meditation practice was significantly correlated with the total mindfulness, kundalini effects, and mystical experiences scores. Further, this strength of meditation practice was also reflected in the multiple regression analysis where the amount of meditation practice was strongly related to the total mindfulness, kundalini effects, and mystical experiences scores. Hence, it appears that the amount of meditation practice is the most significant predictor of the effects of contemplative practice.

It can be speculated that meditation has the strongest association with mindfulness, kundalini effects, and mystical experiences. The associations of yoga, prayer and multiple practices might be seen as simply due to the meditative components contained in each (Knabb, 2012). Unfortunately, this attractive and parsimonious hypothesis cannot be asserted unequivocally. In the present study, it is possible that the relatively weak associations of yoga may be due to yoga being employed as a fitness practice rather than a contemplative practice. In fact, Texas college students have been found to use yoga primarily as an exercise (Quilty et al., 2013). In other studies where yoga is taught and treated as a mindfulness skill first and only secondarily as a fitness method, the associations of yoga and meditation with mindfulness are comparable in magnitude (Carmody & Baer, 2008; Gard, Taquet, et al., 2014; Soler et al., 2014). In addition, when yoga is taught as a contemplative practice it is associated with mystical experiences (Prakash & Caponigro, 2009) and increased self-transcendence, Fiori, David, & Aglioti, 2014). Hence, the prior research outcomes may reflect the emphasis on mindfulness while the present outcome might reflect an emphasis on fitness.

It is also possible that the relatively weak association of prayer with the outcome measures is similarly due to the nature of prayer practice in the sample. Whittington and Scher (2010) identify six different types of prayer (adoration, confession, thanksgiving, supplication, reception, and obligatory prayer). Only the adoration, thanksgiving, and reception types were found to have consistently positive relations with measures of well-being. Also Perez et al. (2011) discovered that only the adoration, thanksgiving, and reception types of prayer are associated with lower depressive symptoms and that they act by different mechanisms. In the present study, we did not identify the type of prayer being employed by the participants. As such the weakness of prayer's relationships with the outcome measures may be due to a mixture of contemplative and non-contemplatives types of prayer. Hence, the present outcome with prayer might not reflect an inherent weakness in prayer associations but rather on the failure to identify and separate the prayer types.

In general, the biggest association of contemplative practice with mindfulness was with the observing component. Using a similar on-line questionnaire technique to the present study, Soler et al. (2014) also found observing to have the greatest difference between meditators and non-meditators. Others have also found observing to be the most salient mindfulness facet of meditators (Carmody & Baer, 2008; Lilja, Lundh, Josefsson, & Falkenström, 2013) and yoga practitioners (Eastman-Mueller et al., 2013). It also appears that observing may be a facet that is independent of the other four facets in measuring mindfulness (Baer et al., 2006). Practice appears to be associated with higher levels of noticing and paying attention to sensory information regardless of whether it originates from the outside or the inside of the individual. This is not surprising as these practices focus on present moment awareness that is composed of the full panoply of sensory information.

The subscales to the Kundalini Awakening Scale are not well empirically verified. They were developed to reflect theoretical components of kundalini effects, but factor analysis of the KAS suggested that scores reflect a single factor with no separate sub-factors (Sanches & Daniels, 2008). However, since there is so little research on kundalini effects they were included here to provide a wider context for the overall scores. In general, the associations with the subscales are highly similar to those seen with the overall score tending to support the contention that the KAS only measures a single factor. Notwithstanding, the present results showed the strongest associations of the contemplative practices was with the changes subscale exactly as observed by Sanches and Daniels (2008). The changes subscale measures "behavioral changes, changes in perception, changes in the modes of mental functioning and changes of consciousness" (Sanches & Daniels, 2008, pg. 81). This subscale appears to be measuring a construct similar to the FFMQ observing subscale. Although the overall scores on the two scales are only weakly correlated ($r = 0.13$, $p < .01$), the FFMQ observing subscale score correlates significantly with the KAS changes subscale score ($r = 0.42$, $p < .001$).

Of the mysticism subscales the largest associations were seen with the extroceptive mystical experiences. "The extrovertive experience looks outward through the senses" (Stace, 1960, p. 61). So, like the observing and the changes subscales the extroceptive subscale focuses on sensory experiences. Indeed, the MYST extroceptive subscale score correlates

significantly with both the FFMQ observing and KAS changes subscale scores ($r = 0.43$; 0.39, $p < .001$, respectively). This suggests that contemplative practices have their greatest associations with the individuals' sensitivity to energies emanating from their internal and external environments and suggests that their primary association is with the real time awareness and appreciation of sensory and perceptual experiences. This hypothesis might explain why the pattern of relationships with mindfulness, kundalini effects, and mystical experiences are all so similar with the different practices. It suggests that sensory and perceptual changes are the common intermediaries between the practices and mindfulness, kundalini effects, and mystical experiences.

There is evidence that contemplative practices produce an enhancement of primary sensory awareness (Cahn, Delorme, & Polich, 2010) and enhanced perceptual clarity and decreased automated reactivity (Cahn, Delorme, & Polich, 2013). Also, it has been observed that tactile sensitivity is better in tai chi practitioners (Kerr et al., 2008) and after a brief body scan meditation (Mirams, Poliakoff, Brown, & Lloyd, 2013). Meditation has been shown to increase auditory (Srinivasan & Baijal, 2007) and visual sensitivity (Panjwani et al., 2000) and yoga breath awareness practices improve visual shape and size discriminations (Telles, Singh, & Balkrishna, 2012). Also, it appears that meditators are more sensitive to respiratory interoceptive sensations (Daubenmier, Sze, Kerr, Kemeny, & Mehling, 2013) and yoga practitioners have enhanced proprioceptive and vestibular body signals, Fiori et al., 2014). Hence, it appears that contemplative practices are associated with enhanced sensory and perceptual inputs to awareness. A recent model of mystical experiences postulates that mystical experiences emanate from contemplative practice induced alterations in sensory and perceptual processing (de Castro, submitted for publication). This suggests that the causal chain is the contemplative practices leading to perceptual alterations which in turn are responsible for the mystical experiences and kundalini effects. Further research is needed to test this hypothesis.

An ambition of the present study was to elucidate the patterns of practice most associated with mindfulness, kundalini effects, and mystical experiences. It is clear from the data that the number of years of practice is the most significant and important practice characteristic associated with heightened mindfulness. This was true with the multiple regressions including all FFMQ total and subscale scores. Soler et al. (2014) also observed that lifetime practice was the most salient practice characteristic associated with mindfulness and Carmody and Baer (2008) found that increases in mindfulness were positively related to the total amount of home practice during an 8-wk MBSR program. The number of years of practice was also weakly associated with the overall and extrovertive mystical experiences. On the other hand, the frequency and social conditions of practice were, in general, either weakly or non-significantly associated with the scale scores. Similar results were reported by Dobkin and Zhao (2011) who did not find a relationship between frequency of practice and changes in mindfulness. Hence, it would seem that it's how much in total and not how frequently or socially practice occurs that is associated with mindfulness and that the pattern of practice has only at best small associations with kundalini effects and mystical experiences.

The present study suffers from a number of limitations not the least of which was that the study was correlational in nature. Cause and effect or third variable causation cannot be distinguished. Although correlation does not prove causation, it is in fact a prerequisite for a causal conclusion. When combined with manipulative research a strong case can be made for both causation and external validity of the results. So, the current study's results can be seen as adding to the case for causality without conclusively demonstrating it.

The present study utilized on-line survey where participants self-reported their practices and experiences. This assumes that the participants have an accurate memory of practice and experience and that they are completely honest and not falling prey to demand characteristics such as social desirability bias or the good-participant role. Some of the questions on the scales ask about experiences that are generally not discussed openly such as from the KAS "I've experienced feelings of some form of energy stored in the genital region" and from the MYST "I have had an experience in which ultimate reality was revealed to me." It is possible that the participant tempered their responses on the scales to better fit socially acceptable norms. It also assumes that the exact meaning of the questions and terms are understood. During the initial stages of the study we became suspicious of participants' selecting Mindfulness Based Stress Reduction (MBSR) as their practice due to inconsistencies with some of their other responses. Emails sent to a number of participants revealed that they were misinterpreting Mindfulness Based Stress Reduction to mean that they used their contemplative practice specifically to reduce stress rather than as a specific program containing meditation, yoga, and body scan. Once the question was refined to indicate the exact nature of MBSR virtually no participants selected it.

The present study participants were either volunteers or students completing a course requirement. This greatly limits the generalizability of the results. Because of the large number of students there was a considerable skewing of the age distribution toward the younger ages. Separate analysis of the data for the students alone revealed essentially the same findings as with the total sample except that the years of practice had a much more restricted range making it difficult to discern effects. The present analyses need to be repeated with more diverse and representative groups.

The participants simply indicated what was their contemplative practice. Since the participants self-selected their practice the groups might differ in other ways than their practice. Different types of people could be attracted to the different types of practice and the results of the present study may reflect more these differences than the differences in contemplative practices.

In conclusion, the findings suggest that meditation has strong associations with psychological/attentional changes reflected in mindfulness and also with the physical and sensory alterations as reflected in kundalini effects and with the perceptual alterations associated with mystical experiences and may be the basis of the associations of yoga and prayer with these outcomes. They further suggest that the primary associations of contemplative practices is with the real time

awareness and appreciation of sensory and perceptual experiences. Finally, they suggest that the total amount of practice over days and years are associated with enhanced mindfulness and possibly mystical experiences, but the pattern and social conditions of practice have little association.

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