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Pranayama and Prosody: Unilateral Nostril Breathing to Enhance

Recognition of Emotional Tone

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and mind, Breathing patterns are a mirror of our mental and physical conditions. For instance, if one is rushed or stressed in their thinking or activities, the breathing pattern is often shallow and the same pattern. On the other hand, when one is calm, the breathing process is smoother,

studied right before their (B minute *arti i*ation and &ithin !i+e minutes a!ter, 5 heart rate, systoli and diastoli)lood *ressures, *ea\$ e4*iratory !lo& rate .s*eed o! e4hale/, sim*le *ro)lem sol+ing a)ility, and mental e!!i ien y &ere all e4amined,

"he)aseline readings o! all three grou*s &ere similar, 5o&e+er, a!ter the (B minute regimens, signi!i ant de lines in heart rate and systoli)lood *ressure, signi!i ant im*ro+ements in *ea\$ e4*iratory !lo& rates, and redu tion in the time ta\$en to solve mathemati al e-uations, &as only seen in the e4*erimental grou*, No signi!i ant di!!eren es in ontrol A or B &ere re*orted, "his sho&ed that normal rela4ation and/or !o us on)reathing alone ould not om*are to ANB in results, "he authors mention)alan ing o! the)rain>s hemis*heres as a *ossi)le me hanism,

"he authors cite in reases in al*ha &a+e a ti+ity, noted in other resear h on yogis, as a *ossi)le orrelate to the results o! their o&n study, Al*ha &a+es are seen during an alert)ut dee*ly rela4ed state, as o)ser+ed in ele troen e*halogram>s .EED/, "hey state that the o)ser+ed redu tion in heart rate, *artnered &ith in reases in utaneous *eri*heral +as ular resistan e .redu tion in)lood !lo& to the sur!a e o! the s\$in/ noted in yogis a!ter meditation, also indi ate *hysiologi al rela4ation along &ith their heightened mental alertness, "hus, *ranayama, s*e i!i ally ANB, seems to im*ro+e)oth mental and *hysi al health and !un tioning, "he ne4t study is an e4 ellent e4am*le o! this,

#amei and olleagues .(BB1/, loo\$ed at orrelations)et&een *ranayama indu ed al*ha rhythms, and natural \$iller ell .N#%/ a ti+ity in the)ody, A N#% signals the immune system to !un tion, *laying a ma;or role in !ighting o!! +iruses and tumors, 6n this study, eight +eteran yoga instru tors .< men and < &omen/ *arti i*ated, During testing,)rain rhythms &ere ontinuously re orded +ia ele trodes *la ed on the su);e ts>

any given time, depending on which nostril is dominant, the opposite hemisphere of the brain has been observed to show more activity. Sauer, (1988), Yogis have claimed that unilateral nostril breathing can be used to alter certain cognitive tasks. Dilbert, (1997), ideally, one might coordinate one's activities with the cognitive functions linked to the hemisphere of the brain that is presently dominant,

though the body does naturally switch to its dominant hemisphere throughout the day, yogis believe that the alternating rhythm is often disturbed, so performing ANB could help assist in balancing the two hemispheres once again, if one desired to manually switch the dominant hemisphere, in order to be better equipped for a specific task, Unilateral Nostril Breathing (UNB), also described by Dilbert (1997), could do the trick, Dilbert (1997) explains that the cool air being inhaled through the dominant nostril can apparently suppress the dominant side of the hemisphere directly above it, allowing the opposite hemisphere to then dominate, however, not all studies have shown this,

Stanford and Shuna (1997) studied the EED readings of 10 trained subjects when practicing in UNB, they called this technique "Alternate Nostril Breathing (ANB)", however the description of what was rated showed that they were actually studying UNB, and of the subjects rated consistent left nostril inhalation and right nostril exhalation, while the other half rated right nostril inhalation and left nostril exhalation, Both of these were rated for two rounds of 15 minutes each, These entire

of the study, All participants engaged in (minutes of UNB prior to any testing to ensure that a minimum baseline was met, In this study, the traditional yogi protocol for UNB was not used, Rather, one nostril was allowed completely allowing for all inhalation and exhalation to occur through the opened nostril,

Four rhyming words were spoken in four emotional tones, "these were joy, anger, sorrow, and neutrality in the four emotions of angry, happy, sad, and neutral, For the emotional targets portion of the testing, subjects were instructed to breathe yes when they heard an angry voice, and no when they did not, when listening for words, they were to breathe yes when they heard the voice speak the word joy, and no when they did not, there were 12 trials of each completed,

The authors noted a significant three-way interaction between listening task, nostril dominance, and nostril assignment, UNB appeared to induce activity in the detection of emotional tones in right nostril dominant participants, UNB did not, however, seem to affect,

successful social interaction relies on immediate perception of both visual and auditory emotional cues as well as multi sensory integration (MSI),

The high functioning adults with PDD and thirteen cognitively healthy adult controls participated in the study. All were given the Wechsler Adult Intelligence Scale, Dutch edition (WAIS-III), and were also found to be free of other neurological disorders and substance abuse. PDD adults and controls were matched for age and IQ scores. Subjects were compared while processing fearful faces and happy faces. MSI was studied, using EEG, by distinguishing the effects of cross-modal presentation, such as fearful and happy facial expressions were paired with congruent or incongruent emotionally-toned audio. Subjects were permitted to take all the time they needed to come to their answers.

It was found that the PDD individuals differed from the controls in their MSI of fearful information from visual and auditory samples. Although both groups showed similar readings concerning visual emotion processing, the PDD group showed irregularities in processing of the fearful face combinations. The authors state that, because of the importance of immediate MSI for social competence, MSI differences in PDD may be correlated to the deficits shown in their emotional behavior. Deficits in one's ability to detect and understand the emotions of others are seen in socially inept disorders, such as schizoid, as well,

Blair and Mitchell (2006) echo the sentiments of the above researchers, as they state that the processing of emotional expressions is fundamental for normal socialization and interaction. They studied the ability of schizoid and non-schizoid adults to process emotional prosody. They used the 5are Psy schizoid %he \$list1Revised .P%2KRH

R, D, 5are, 1??1/, to determine ea h su);e t's status,

"he e4*eriment onsisted o! t&o grou*s, "hirtyInine men *arti i*ated all together, All &ere in ar erated indi+iduals &ho &ere se*arated)ased on their diagnosis o! *sy ho*athy, Blair et al .(BB(/ *resented *arti i*ants &ith neutral &ords that &ere s*o\$en &ith intonations on+eying ha**iness, disgust, anger, sadness, or !ear, Parti i*ants &ere as\$ed to identi!y the emotion o! the s*ea\$er)ased on +o al a!!e t, not the de!inition o! the &ord, Su);e ts &ere gi+en as mu h time as they needed to ans&er ea h, "he hoi es o! &hi h emotion might)e heard &ere ontinuously a+aila)le !or the *arti i*ants to +ie&, !t should)e noted that these ad+antages, &hi h &ere also seen in the *re+ious study, &ould not)e a+aila)le during real!!i!e intera tions,

!t &as !ound that *sy ho*athi indi+iduals &ere se+erely im*aired in identi!ying !ear!ul +oi e intonations, "here &as also a strong orrelation !ound)et&een a high s ore on the *sy ho*athy s ale and an im*aired a)ility to identi!y sad +o al a!!e t, "here &as no signi!i ant di!!eren e seen)et&een the t&o grou*s and their a)ility to re ogni0e other emotional tones,

Blair and olleagues .(BB(/)elie+e that these !indieth!M"dehen the laims that *sy ho*athy is a neuro! ogniti+e disorder, "hey state that it is a**arent a ross a *erson's li!els*an as hildren &ho dis*lay *sy ho*athi tenden ies also sho& su h im*airments, "hese, o! ourse, ould)e onsidered e4!Rne ases!! yet a+erage *eo*le an ha+e di!!i ulty *i \$ing u* on the su)tle emotional ues o! others as &ell, "his is something than im*air the -uality o! one's inter*ersonallationshi*s and e+en ones o u*ation,

Ste&art and Reynolds .(BB(/ re+ie& the im*ortan e o! em*athy in do tor!atient intera tions and -uality o! are, "hey state that em*athy is a multi!dimensional on e*t

speculate that looking at this area might help in the understanding and treatment of cognitive disorders such as PDD and anxiety disorders as well,

but the claims given to ANB, UNB, and other pranayama techniques are correct, one should wonder why they are not being utilized more often in psychology, medicine, the workplace, or everyday functioning. Clearly, they could potentially hold a variety of applications, possibly helping to naturally improve functioning and efficiency. These studies do raise a few questions themselves, especially in relation to UNB,

Does practicing UNB for a specific hemisphere truly change the brain's performance in certain tasks? Could a person's ability to detect emotional affect be significantly enhanced with its practice? Could their empathy be significantly increased as a result? These are some of the questions the current study attempted to answer. This study hypothesized that left-sided UNB (UNB-L), bringing forth right hemisphere dominance, would be found to increase a person's ability to detect and correctly identify another's emotional tone,

Method

Participants

No compensation was supplied by the researchers; however, all were thanked for their time, efforts, and cooperation in the experiment.

Materials

it for 15 minutes before taking part in the same exercise again to see what effect, if any, it might have on their perception of these tones, "the form did not state what the potential effect was expected to be,

"the informed consent form made it clear that their participation in this experiment was completely voluntary and that not participating would not involve any penalty, it made them aware of any potential compensation and stated that they were responsible for making sure any credit that they were entitled to was received,

their dominant nostril by alternately breathing through each, one at a time, to see which was the easiest to breathe through, they recorded this on their worksheet, "the first part of testing then began,

Subjects listened to the EP" .Dreen et al., (BB1/ and filled out the corresponding worksheet, After completion of this first round, subjects were either taught a deep diaphragmatic breathing .see *roto ol in)o4)elo&/ and asked to practice this breath for 1B minutes or UNB in either the left or right nostrils .see *roto ol in)o4)elo&/, again, practicing for 1B minutes, this depended on which group they were randomly assigned to, Subjects were then asked to fill their worksheet over to once again test their ability to detect emotions, using the same recordings, Practice time was not considered to be an issue as all subjects had the same chance of correctly or incorrectly identifying the information regardless,

Once complete, all worksheets were collected and a debriefing form was handed out, this form asked what had taken place and stated the hypothesis of the study, it thanked all for their participation and supplied the contact information of the researcher and finally once more, if subjects had any further questions, comments, or concerns, or desired to view the results of the study upon completion, they were invited to contact the researcher,

Diaphragmatic Breathing:

Subjects were asked to take slow, smooth breaths in and out as described in the procedure. Subjects were then asked to practice this breath for 1B minutes or UNB in either the left or right nostrils for 1B minutes, this depended on which group they were randomly assigned to, Subjects were then asked to fill their worksheet over to once again test their ability to detect emotions, using the same recordings, Practice time was not considered to be an issue as all subjects had the same chance of correctly or incorrectly identifying the information regardless,

na+els to&ard their s*ines,8 using their a)dominal mus les to e4*el the air !ully !rom the lungs, "his dee*)reathing te hni-ue &as re*eated until e+eryone !elt om!orta)le and &as then *ra ti ed !or 1B minutes,

Unilateral Nostril Breathing .UNB/:

Su);e ts &ere instru ted to !old the inde4 and middle !ingers o! their right hand in to&ard the enter o! their *alms, "heir ring and *in\$y !ingers &ere to stay together and e4tended, thum) also e4tended, 6! this &as too di!!i ult, they &ere *ermitted to rest the ti*s o! the inde4 and middle !ingers on the !orehead in!)et&een the eye)ro&s, holding the other !ingers in the same &ay as des ri)ed a)o+e, 6! still too di!!i ult, they &ere as\$ed to sim*ly !old the middle, ring, and *in\$y !ingers in, and e4tend the inde4 and thum) only, "he !irst, and the se ond, hand *ositions are the traditional &ays to *ra ti e the te hni-ue in yoga, &hi h is &hy they &ere as\$ed to try these !irst,

6! assigned to le!t!sided UNB .2UNB/, the hand &as held u* to the nose and the thum), in any *osition, &as used to lose the right nostril, "he *arti i*ant &as told to inhale !ully through the le!t nostril, using slo&, dee*, steady)reathing, "hey &ere then as\$ed to *in h)oth nostrils losed, hold, and then release the thum) !rom the right nostril, still losing the le!t, to e4hale !ully !rom there, Su);e ts then *in hed the nostrils losed on e more and re*eated, inhaling through the le!t again and e4haling through the right,

6! assigned to right!sided UNB .RUNB/ the a)o+e &as *ra ti ed in the same &ay)ut in a re+erse order, 6nstead o! inhaling through the le!t, su);e ts o*ened the right nostril !irst, inhaled, and *in hed!! o*en the le!t nostril, e4haled, *in hed, and re*eated this *attern, 'ust as &ith the dia*hragmati)reathing, *arti i*ants *ra ti ed)rie!ly, until

de reased, $F(3, 11) = 1.3, p = .31, \eta^2 = .11$, $p = .001$, $d = .11$, Figure 1), there were no statistically significant differences seen in the other emotional subsets,

Discussion

The results did show a statistically significant increase in one's ability to detect an emotional tone when 2UNB was rated, the 2UNB group did better on prosodic recognition overall, following the decrease, while the RUNB group actually did worse, therefore, it could appear that this breathing technique was successful in shifting dominance to the right hemisphere, this finding is consistent with that of Sawyer, et al. (2011), discussed previously,

Although empathy was not empirically studied in the present research, one could expect to find its increase with the rating of 2UNB, especially when examining how empathetic functioning is connected to the right cerebral hemisphere in other studies, Prior research on the degenerative condition of frontotemporal dementia shows that right temporal lobe atrophy severely impairs both social and prosodic recognition of emotion, greatly affects interpersonal skills as well as the ability to convey or even to feel emotions, and completely removes the ability to empathize in some patients. Perry, et al., (2011), further show that emotional impairments are seen when the lobe is damaged, it stands to reason that the results here may be a consequence of the same mechanism,

emotions do not seem to produce statistical differences in these tests is left to speculation, Perhaps the detection of fear is one of the most necessary from a survival standpoint and this might be why it produces the strongest, and in these cases the only, effect in testing. Both positive and negative, in the present research, it was originally anticipated that differences would be found on all of the emotional subtests, As with most studies, limitations must be taken into account,

The use of convenient sampling caused issues in judging the homogeneousness of the participants, the large majority of subjects were (1 something 1 year 1 old %au asian females and all volunteers were college students, One could argue that this might make it difficult to generalize results to the rest of the population, It is interesting to note that the majority of left handed participants were found in the 2UNB group as well, the sample size was a small one to start with from the beginning, the removal of the control as further limiting, finally, conducting the experiment in group settings proved less than ideal as it was unclear if all participants had successfully learned and properly performed the pranayama techniques, Unfortunately, while right nostril dominant was documented, most right nostril dominant was not recorded, this could have been useful in confirming that the correct dominant was in place for each group during the post EP", the presence of so many other subjects could have been a distraction as well,

Suggestions for future research would be to obtain a larger and more diverse sample and to perform the experiment on a one-on-one basis in order to guarantee that subjects are properly trained in, and performing, the breathing techniques, or further assurance, documenting most right nostril dominant, or better yet, utilizing EED techniques could be superlative, It may be necessary to include left handed and ambidextrous

*arti i*ants in order to o)tain learner results in the !uture as &ell,

"he results o! this study hel* to e4*and and ontri)ute to the urrent)ody o!

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Ste&art, M, :., I Reynolds, :., ', .(BB(/ Em*athy and -uality o! are, /ritish Journal

"a)le 1, Mean Pre|Post Di!!eren es on the EP" among 2UNB, RUNB, and %ontrol

.Dia*hragmati Breathing/ Drou*s,

	2e!t	%ontrol	Right	F	p
5a**y	1B,A3	1B,@3	1B,C(B,(@	B,FAC
Angry	1B,A3	1B,3?	1B,(F	B,(?	B,FA1
9ear	B,BA	1B,CF	1B,F3	1,C<	B,(B<
Neutral	1B,1C	B,(1B,(F	B,C?	B,ABF
Sad	B,3F	B,BC	B,FF	1,?3	B,1AA

"a)le (, Estimated Marginal Means, Signifi ant di!!eren e sho&n in)old!a e ty*e,

2UNB	RUNB
Mean S	Mean S

Figure 1, Estimated Marginal Means of 2UNB .1/ +s RUNB .(/,

B1BBB?BBBBB3F<BBBBBBB(BB1 BBBB BBBB<BBBBBB3B1B@BBBABBBBBB)B(BBBBBBBB
BABBBBBB B(edB@(CB)B<BBBBB(eB11@BB1 BBBB!)B(? !BBBBBBBBBBBB?BB1BBBBB
BBBB<<BBB1(A<C?CdCAF3(B<eCAFF(BA(C!CdC1CeBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
BBBB<BBBBB(dB1BBBB<BBBBBB(B1B1BBBABBBBBB?B(BBBBBB(BdBBBBB3(BaAaBBB
BBBB1BBB<BBBBBBBBB((B)e?B@(Bd?(dBB1 BBBB!)B(1BBBBFBBBBBBBBB) B(BBBBB
BBBB1B(B((A3F?F3F<CACdBBBBBBBBBBBBBBBBBBBB1@BBBBBB1BBBBB?BFa3<B(e<B<B
BBBB<BBBBB(dB1B1BBB3BBBBBBBBBB