Executive Masters in NeuroLeadership

NeuroLeadership Institute

Year 2 Research Project (Feb 2015)

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Smarter Meetings at GE :

Changing Behaviours to

Boost Meeting Effectiveness

Abstract

To make optimal workplace decisions, effective meetings are needed which generate high cognitive performance, employee engagement and trust. Research suggests many meetings fall short of this, resulting in unintended and expensive consequences for both companies and employees.

This pilot study identified one possible way to create smarter, engaging, yet shorter meetings, by training 6 GE UK teams on brain-friendly, prosocial meeting behaviours, notably turn-taking and mentalizing (everyday mind-reading). Bringing the human connection back into meetings increased self-reported **satisfaction with team meetings**, **team performance**, **creativity**, **effectiveness**, **engagement**, **commitment**, **healthy conflict** and **trust**, with lesser improvements in **psychological well-being**.

Although further research within larger groups would be necessary to confirm the findings, this study does suggest that people-friendly, mindful meetings may be one way to build a more stable foundation of trust and engagement, alongside an increased bias for action.

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Acknowledgements

Michelle Zanette, Assoc Director of Biostatistics, GE Healthcare: for use of statistical super-computer/brain.

Wordcount: 5993 (excl figures, tables & abstract 462)

Introduction

How much time do you spend in meetings? What is the effectiveness of those meetings? And where do you do your best thinking? Typical responses are 'too much', 'not enough' and 'bed, car', but mostly (per Archimedes) 'bathroom'. Typically it's anywhere but the meeting.

With adaptive teams, network collaboration and matrixed, horizontal or responsive organisations, many of us now spend much of our daily life in meetings; information sharing, brainstorming and problem-solving. Meetings can easily go off subject, lack goals and agenda, be lengthy, inadequately prepared, inconclusive, disorganised, lacking in control, irrelevant and generally waste time. With most corporate decisions made collectively within meetings, how effective are we in these meetings and how smart are the subsequent decisions made? If we were to 'ditch the pitch' and focus on meetings from a brain or behavioural, rather than a process perspective, could we produce meetings that genuinely support a questioning, empowered workforce?

To consider these questions, a small exploratory study was undertaken at General Electric (GE), supported by research[1] proposing that a group's collective intelligence is correlated to three key factors; the participants' social sensitivity or mentalizing ability (being aware of our own and others' mental states), the amount of turn-taking in discussion and the proportion of females in the group[2]. Recent follow up research[3] confirmed that these findings also apply equally to online groups.

But how can such socially sensitive, turn-taking meetings be run in male dominated industrial environments, featuring strong focused 'can-do' attitudes? How can smart brain-friendly meetings, that boost the potential for collective intelligence, be run in the real world?

With specific collective intelligence testing outside the scope of this study, sample teams were instead given brief training in the neuroscience behind their brains in meetings, together with simple practical techniques[4] in generative thinking and turn-taking, with the hypothesis:

> *H_1 = social sensitivity and turn-taking during in-person meetings (through applying Thinking Environment[4] and NeuroLeadership[5] teachings) improves self-reported team performance, satisfaction with meetings and individual well-being.*

Within constraints of small samples, self-reported measurements and complex organisational structures, this pilot aims simply to test the hypothesis and identify findings suitable for further investigation. Turn-taking in this study will be through prescribed uninterrupted rounds followed by natural equal distribution of chat, rather than purely equal distribution of chat, per the collective intelligence research.

Mindless Meetings - The Hidden Costs

"A meeting is a gathering where people speak up, say nothing, and then all disagree." [6]

The Financial Cost

Despite meetings being a common daily activity with rich social dynamics, they are considered a 'neglected social form in organizational studies'[7], used primarily as a methodological tool to study topics such as group decision making. They have surprisingly few solid empirical studies of their own.

Even back in the 1980/90s, an estimated 11 million US meetings a day[8] were held, with the average senior manager spending 23 hours per week[9] or between 25-80% of their time[10] [11] in meetings. Worryingly, an estimated 50% of time (or 30 man-days per year, per attendee)[12] is considered wasted due to poor meeting preparation, ad-hoc scheduling and lack of meeting management training, with participants feeling the 'bitter after-taste'[7] of time wasted, through low group participation, free riders, bad decision-making processes and failure to hold the group's attention. Disturbingly, "*for most executives, managers and supervisors, the meeting is the only work-management tool they've ever used for collaboration*"[13]

Even in 1989 unproductive meetings were costing US companies an estimated $37BN[14] a year. More recently in 2012, they cost UK companies[15] £26BN a year, equating to 1.7% of UK GDP. One survey[8] found 91% of meeting attendees admitted to daydreaming, 73% to bringing along other work and 39% having dozed off. Fuze.com[16] suggested most meetings are as valuable as a Snapchat post, with ideas quickly disappearing without outcome or follow up.

The Human Cost

But it's not just financial costs. The number of meetings attended (rather than the duration), has been associated with daily fatigue and subjective workload[17], impacts job attitudes, well-being and intent to leave the organisation[18] and is an important predictor of overall employee job satisfaction[19]. Anyone who needs to mask or supress their emotions in meetings runs the risk of negative long-term outcomes such as burnout or quitting the organisation[20].

In line with stress research literature, meetings can be likened to the negative affects[17] of 'interruptions' and 'daily hassles', especially frustrating for goal orientated or driven individuals. One participant from this study noted: "*There are probably too many meetings overall. Team members break their concentration on detailed or analytical tasks for the purpose of attending meetings and this can create a little resentment at times*." With 'meeting recovery syndrome'[21] cool-off time necessary, scheduling of multiple back-to-back meetings and probable increased multi-tasking behaviours 'required', you start to get a sense of the potential overwhelm caused through subjective meeting workload. Indeed, a Microsoft 2013 survey[22] confirmed that 55% of staff did not have the headspace in the office to do their best thinking or generate new ideas, as a result of 'too many meetings and too much information and emails'.

"*Bad meetings and what they indicate and provoke in an organisation, generates real human suffering in the form of anger, lethargy and cynicism"*[23]. This might explain Gallup's 2013 State of the American Workplace survey[24] findings, showing just 30% of the US workforce feel engaged in their work, with the remaining unengaged 70 million costing the US economy $550BN each year.

As GE founder Thomas Edison commented, "*time is really the only capital that any human being has and the thing that he can least afford to waste or lose*."

The Cost of Meetings at GE

With a 122 year history, revenues of $149BN and 300,000+ global employees, GE is one of the world's most successful and innovative companies, aiming to 'solve the world's toughest problems'.

Being a large, complex and matrixed organisation, an unofficial estimate of the time spent in meetings for GE employees and contractors equates to a human capital cost of approx. $14.1BN[A] per year. If GE sought to improve meeting efficiency and effectiveness by 20-50%, this could potentially release annual manpower productivity savings of $2.8 to $7.0BN, in addition to direct virtual meeting cost savings and possible well-being benefits.

Brain-Friendly Meetings

Basic design features such as agendas, minute keeping, punctuality, suitable meeting facilities and a chairperson can improve perceived meeting effectiveness[25], as can power-balanced meetings[26] that lessen social pressure, group think and social loafing and promote communication, free evaluation of ideas and do not avoid disagreements.

To encourage collective intelligence in socially complex meeting environments, the following steps are proposed.

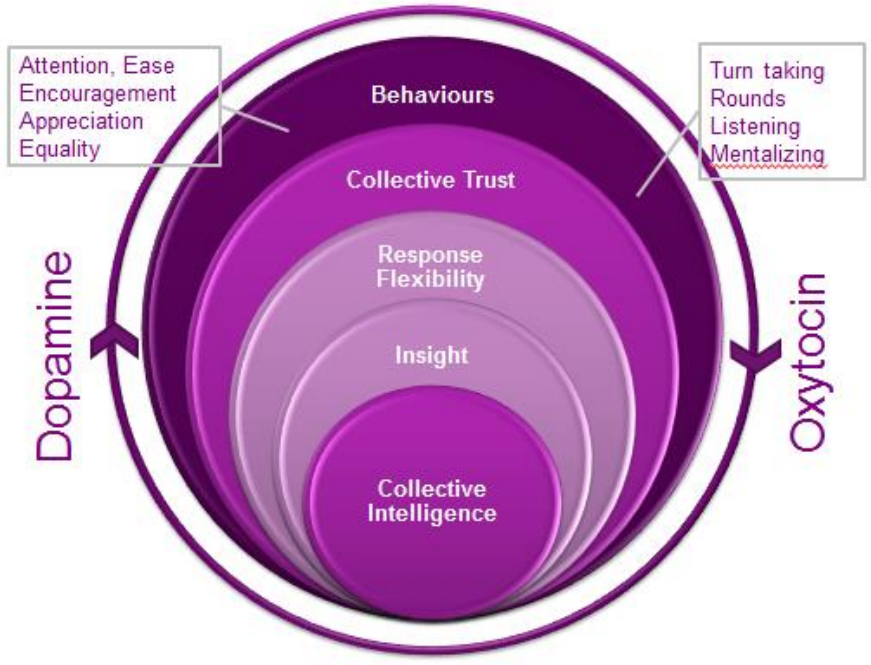

Figure 1. Possible steps to collective intelligence

[A] *based on global headcount across 6 bands, (excluding company officers) each spending an estimated proportion of time (varying between 15-75%) in meetings, with salary band estimates [confirmed by GE N.Europe Comp&Bens dept], plus 30% employer costs*

Behaviours

From the brain's perspective, meetings are a soap opera of 'friend or foe' interactions, much played out subconsciously. Fickle responses stem from genetics, prior meeting and life experiences, corporate cultures, expectations, SCARF[27] elements, daily events and physical conditions such as hunger, tiredness, lack of space etc. Behaviours and moods, whether positive or negative ripple out as group contagion, especially from charismatic leaders[28], with people being 'walking mood inductors' influencing those around them[29].

A good meeting can see the brain at peak performance, with moments of insight, clarity and feel-good rushes of dopamine. But a bad meeting can see perceived slights or social pinches, competitive or dominant behaviours and fear of failure or job insecurity creating adrenaline and cortisol releases, a drop in dopamine and a limbic response that down-regulates the pre-frontal cortex (PFC) and its powerful executive capabilities. "*The pressure to conform to group norms can be enormous. We may feel inhibited from voicing opinions or ideas; we may even find ourselves uttering or agreeing to ideas that we would not support outside the group*"[30]. Such cognitively 'dumbed down' meetings can produce unbalanced discussions, minimal creativity and poor decision making. Even the topic itself can impact abilities. Simply thinking about a lack of resources (scarcity) can lower IQ by up to 13 points[31].

Research[19] has begun to question whether employee satisfaction within meetings might be associated with behavioural outcomes. Although not empirically tested, Kline's Thinking Environment (TE) and Transforming Meetings® concept[4], based on years of meeting observation, concurs, by suggesting that the key element in individual and collective thinking are the behaviours displayed within the group. 10 behaviours seem particularly important and of these, the 5 most potentially impactful, along with 4 simple techniques, were taught and tested within this study.

Behaviours:

1. ***Attention***: uninterrupted, silent and with sustained eye contact to calm limbic responses
2. ***Ease***: encouraging neural mirroring or non-conscious mimicry via the Chameleon Effect[32]
3. ***Equality***: giving equal turns and attention to balance introvert and extrovert participation, flatten hierarchies, reduce dominance, allow everyone to play devil's advocate and balance out focused men vs descriptive women
4. ***Appreciation***: both verbally and non-verbally, activating the brain's reward centres
5. ***Encouragement***: slight social pressure to encourage further thinking, negating the brainstorming issue of stopping too soon. Per Edison "*When you have exhausted all possibilities, remember this - you haven't.*"

Techniques:

1. ***Rounds:*** This disciplined process gives everyone a voice, through uninterrupted, orderly turns, answering one specific question and with sustained speaker to group eye contact and strong group to speaker attention. Typically run over 2-3 circuits, moments of silence are supported, but without any interrupting 'tailgating' behaviours that might imply status loss. The resulting creative expression space permits System 2[33] (or Reflective C-System[34]) higher executive 'conscious' thinking and protects the group from their own cognitive inadequacies, namely the instinctual System 1 (or Reflexive X-System) thinking. Such thinking is associated with casual

interpretations, quick answers to difficult questions, ignoring of challenging facts (especially regarding risk) and any of the corner cutting, objectivism, self-protection or time and money biases[35] that undermine decision making. When pressure is intense and the cognitive load of complex information high, rounds may minimise inattentional blindness or loss of situational awareness by allowing the group to stop, step back and consider the obvious, asking necessary additional questions. The round reduces emotional, edge-of-seat, intense conversations that are so tiring for the PFC, providing sufficient space for both critical and creative thinking, something the brain can't easily do simultaneously, but is often expected to. Hanging back mentally between turns provides opportunity for mind-wandering, off-task thinking or a cognitive resting period necessary to 'cognitively re-structure'[36] or view problems differently. It allows people the opportunity to move from transient[37] or transactional distracted listening, just deep enough to consider the next move, to transformational or generative[4] thinking which develops deeper connections and helps generates insights. The concept of uninterrupted rounds is indeed now being advocated by new social technology, organisational consultancies.[38]

2. ***Opening & Closing Positive Rounds***: Positive prosocial rounds at the start of the meeting generate social cohesion, group pride ('rooting for your own tribe') and team commitment. Oxytocin releases (producing feelings of care, compassion and in-group bonding), support our fundamental human need for social connection and belonging[39] [40]. Such positive mood has been found to facilitate insight[36] and may create more openness necessary for upcoming challenging discussions. Creating an optimistic meeting end association through a positive closing round, per Kahneman's Peak End Rule[41], sets positive expectations, preparing members for the next meeting.
3. ***Thinking Pairs*:** These short, timed, 1:1, uninterrupted, 'sounding board' monologues, taken in turn, offer the potential for insight though verbalising with silence and attention and are occasionally undertaken in meetings to 'warm up' thinking prior to rounds or to minimise conflict, by allowing disagreement to be fully and safely, expressed and 'heard'.
4. ***Agenda in form of a Question***: This simple technique helps solutions thinking, by focusing on a carefully worded question, reducing the likelihood of side-tracked discussions, one of the key reasons for meeting derailment.

Rounds link to Rock's SCARF[27] model, by:

- ***Status***: the dopamine reward of an uninterrupted completely expressed thought
- ***Certainty***: knowing your turn to speak will come
- ***Autonomy***: knowing you can speak uninterrupted
- ***Relatedness***: receiving the group's attention, implying group belonging
- ***Fairness***: the chance to be heard equally and fully

Once rounds are complete and normal group conversation resumes, anecdotally teams tend to distribute their chat more equally, in a socially sensitive way, in line with the collective intelligence research[1].

Collective Trust

The above behaviours contribute to a sense of collective trust. High trust societies often succeed economically and the same applies to teams[42]. Trust is a fundamental prerequisite for effective

collaboration and is at the heart of a truly responsive organisation. Our caveman tendencies encourage the seeking and reciprocation of trusting behaviours, with oxytocin triggering feelings of warmth, safety and comfort. In addition to generating a sense of team bonding, oxytocin reduces pain, stress and anxiety[43], further supporting optimal cognitive performance.

If mentalizing abilities are extinguished by increased cognitive load[44], meaning our brains struggle to think socially and analytically simultaneously, then trust in meetings may limit the need for self-protecting, social self-monitoring, providing more opportunity for analytical thinking. We can think more about the problem at hand, rather than how others will judge us.

Trust generating behaviours and techniques such as the rounds, minimises threat responses allowing for better thinking and permit introverts to thrive. With meetings themselves generating team bonding and trust, separate team building events become less necessary.

Response Flexibility

Viktor Frankl[45] wrote "*between stimulus and response, there is a space. In that space is our power to choose our response*". That space, that ability to pause and mindfully choose before acting, especially in response to strong emotional stimulus or 'knee-jerk reactions', is response flexibility[46].

Neuroanatomist Jill BolteTaylor[47] suggests that the neuronal communication stimulated by an emotion might cease to exist after 90-seconds, provided it is not retriggered. If correct, then mindfully waiting before responding weakens the emotion, deactivates the amygdala and brings the executive functioning PFC back on line, resulting in a more measured response. The 'spill-over effect'[48] of inhibiting an instinctual motor response, such as blurting out a response, perhaps crosses modalities and also inhibits amygdala activity. Waiting your turn to speak, whilst difficult for some, might just be calming for everyone.

Rounds, which anecdotally produce more respectful and balanced turn-taking afterwards, even when not instructed to do so, may offer this response flexibility so minimising the risk from impulsive decision making. Even without specific emotional regulation strategies, simply teaching participants about their own brain and responses, allows them to mindfully and naturally label[49], reappraise[50] and distance[51], so bringing all-important self-control to decision making.

Insight

Edison said "*To do much clear thinking, a person must arrange for regular periods of solitude when they can concentrate and indulge the imagination without distraction*". Uninterrupted rounds and occasional thinking pairs may make this 'solitude' possible within the meeting itself, enhancing creative potential, through the processes of insight, divergent thinking and improvising. He also said "*I readily absorb ideas from every source, frequently starting where the last person left off*." Whilst waiting to speak, there is nothing to do other than listen. Anecdotally, as listening improves, so does the chance of new and diverse ideas being triggered.

Rounds most likely see the temporary performance pressure from potential group rejection risk, offset against the safety of non-interrupted attention, taking participants close to their peak cognitive performance 'sweet spot'[52]. Anecdotally, participants report clear mental focus and original thinking. Although the science of creativity is still evolving[53] [54], it is likely that by removing discussions and the urge to interrupt, rounds may provide a passive cognitive rest period with reduced external and

internal distractions, necessary for the quieter brain activity and temporary down-regulation of frontal lobes that seems to precede insight[36]. By removing the focused, 'furrowed-brow' efforts to solve issues, insight is more likely. Any feel-good, post-insight dopamine reward is also a change agent, setting positive expectations for future meetings.

Collective Intelligence

Teaching people to understand and be aware of possible cognitive meeting responses, combined with the TE's simple theory and techniques, may practically create the social sensitivity, mentalising and turn-taking, necessary for collective intelligence and collective competence.

Putting GE's Meetings on the Research Agenda

Method

Sample

Training Groups: Over 2 consecutive weeks, 6 geographically varied teams (sized 3-11) totalling 38 employees (31:7 male/female), plus 6 male managers, were trained on-site in 4 groups, within a morning's training session. The teams varied from engineers to software designers to finance industry professionals and included one cross-functional project team. The selection criteria was having little/no TE/NL knowledge and regularly meeting as a team. The late summer training window prohibited full team attendance.

Comparison (FEM) Group: To determine if receiving meeting training (or just training) might create change, a semi-comparison group was selected (based on its timing), who were scheduled to receive GE's 2 day Facilitating Effective Meetings (FEM) Training. FEM forms part of GE's global Leadership Skills programme and covers meeting structures and planning, participant involvement, communication skills, preventions and interventions. Although the participants (n=11) were not an absolute team, they were from the same site and function, knew each other well and occasionally collaborated. To determine class suitability, subsequent class survey results for all 27 European FEM 2014 classes were assessed. To the questions 'My knowledge and/or skills have increased as a result of this learning experience' and 'I will recommend this learning experience to others', this particular class ranked joint 15th and 18th respectively. Although lower than the median, the class was deemed representative. Note: with such a small sample, FEM findings will be read with caution and this study **does not test the efficacy** of GE's FEM programme.

Control Group: A control group (n=25) consisted of the respondents to an emailed on-line survey request sent to 175 GE employees, selected at random (every 190th and 254th) from a headcount report of 19,000+ employees.

Procedure

Teams were invited by their HR manager and a few days prior received an email outlining the training and study, with a sample consent form for review. Immediately prior to training, participants were briefed and completed hard copy consent forms and the baseline survey. Training participant survey

data was collected anonymously (using a self-generated unique ID) and opt outs were available from survey completion.

A possible self-serving bias meant managers' data was not collected anonymously or in detail, based on findings[55] suggesting that respondents who served as meeting facilitators or those in higher organisational positions, gave more positive ratings of meeting quality.

The Control group completed an on-line survey (using GE's anonymous survey tool) and provided consent within one of the questions. One participant answered No to this question and was excluded.

Follow up anonymous on-line surveys were issued to all groups 7-9 weeks later with a 3 week response window, giving an estimated 10 week difference between baseline and follow up survey completion.

Surveys

(See S1/S2 for survey formats)

The surveys used a 7-item Likert Scale and included sections on:

- Overall **Key Measure** "Overall how do you rate your team meetings"?
- **Psychological Well-Being** using Ed Deiner's 2009 *The Flourishing Scale (FS)*[56], which is a simple 8-item reliable and valid measure, selected to test possible associations between improved team meetings and wellbeing[18].
- **Team Performance** using Lencioni's *Five Dysfunctions of a Team survey*[57], which is a 15-item scale measuring *Avoidance of Accountability, Lack of Commitment, Fear of Conflict, Inattention to Results & Absence of Trust* and focusing on behaviours and team mechanisms, such as communication and cohesion, rather than outputs and achievements. Although lacking in empirical evidence, reliance was placed on similarity to the new and validated[58] (but copyright unavailable) *The Five Behaviours of a Cohesive Team*[59] (featuring 5 extra questions and minor question rewording). For comparison purposes, the original 3-item scale was extended to a 7-item Likert scale.
- **(Satisfaction with) Team Meetings** is a simple self-created 12-item scale, based on anecdotal training comments, measuring *Attention, Creativity, Effectiveness & Engagement*. Although un-validated, the questions are considered appropriate for pilot research purposes.
- **Qualitative question** about team meetings.

The baseline survey additionally included:

- Self-generated **unique identifier**
- **Demographics**

The follow up survey additionally included:

- Perceived **training benefits**
- **Qualitative question** about team changes seen since training

Only the overall key measure, qualitative questions and follow up benefits were asked of the managers.

Smarter Meetings Training Content

A 90-min neuroscience based theory session covered: overarching brain principle of threat/reward, PFC & amygdala, threatened brain in meetings, Rock's SCARF model[27], cognitive performance curve, thinking 'types' (default, analytical, insight) and implications for group decision making.

A 90-min experiential session followed covering collective intelligence theory[1] and TE theory[4], plus facilitated Thinking Pairs, Rounds and Positive Opening & Closing Rounds.

Results

Analysis Population and Demographics

The analysis population comprised of non-manager level subjects (n=74) who completed the baseline survey. Of these, 44 (59.5%) completed the follow up survey approximately 10 weeks later. 4 of the initial 6 managers completed both surveys and manager results are assessed separately. 6 subjects who only submitted post-baseline surveys were excluded. Missing data were not imputed and were considered missing in the analysis. Analyses were performed using SAS v9.3.

The industrial nature of the businesses selected was reflected in the 73% overall male demographic (training 82%, FEM 46%, control 72%). The 3 group types were similar in age and tenure, with mean age between 41.5 and 43.3 years (SD 8.41 to 12.44 years) and mean tenure between 8.2 to 11.6 years (SD 6.32 to 12.59 years). The FEM group was notably more junior by band (see S3) and more equal by gender.

To consider baseline data reliance, participant age and tenure were briefly assessed (see S4). The mean key measure by age appears to support the findings that job satisfaction is U shaped by age[60] and job tenure (more so than organizational tenure) is associated with job satisfaction[61]. With meeting satisfaction being linked to job satisfaction[19], this further supports the baseline data's suitability.

Results by Measure and Sub-Measure

Change from baseline (CFB) results by measure are represented in Fig 2 (see S5), with the mean and SD calculated on the *sum of all responses, w*here there were multiple questions per measure.

The results indicate improvement in scores after training within all measures for the training group, with statistically significant positive CFB in the **key measure** ($p<0.001$), **team meetings** ($p<0.01$), and **team performance** ($p<0.01$). The follow up score for **psychological well-being** increased for the FEM group, but with high variability of results (possibly as a result of small sample sizes) the results did not reach statistical significance. The control group showed a decline in scores for all measures. No other measures were statistically significantly.

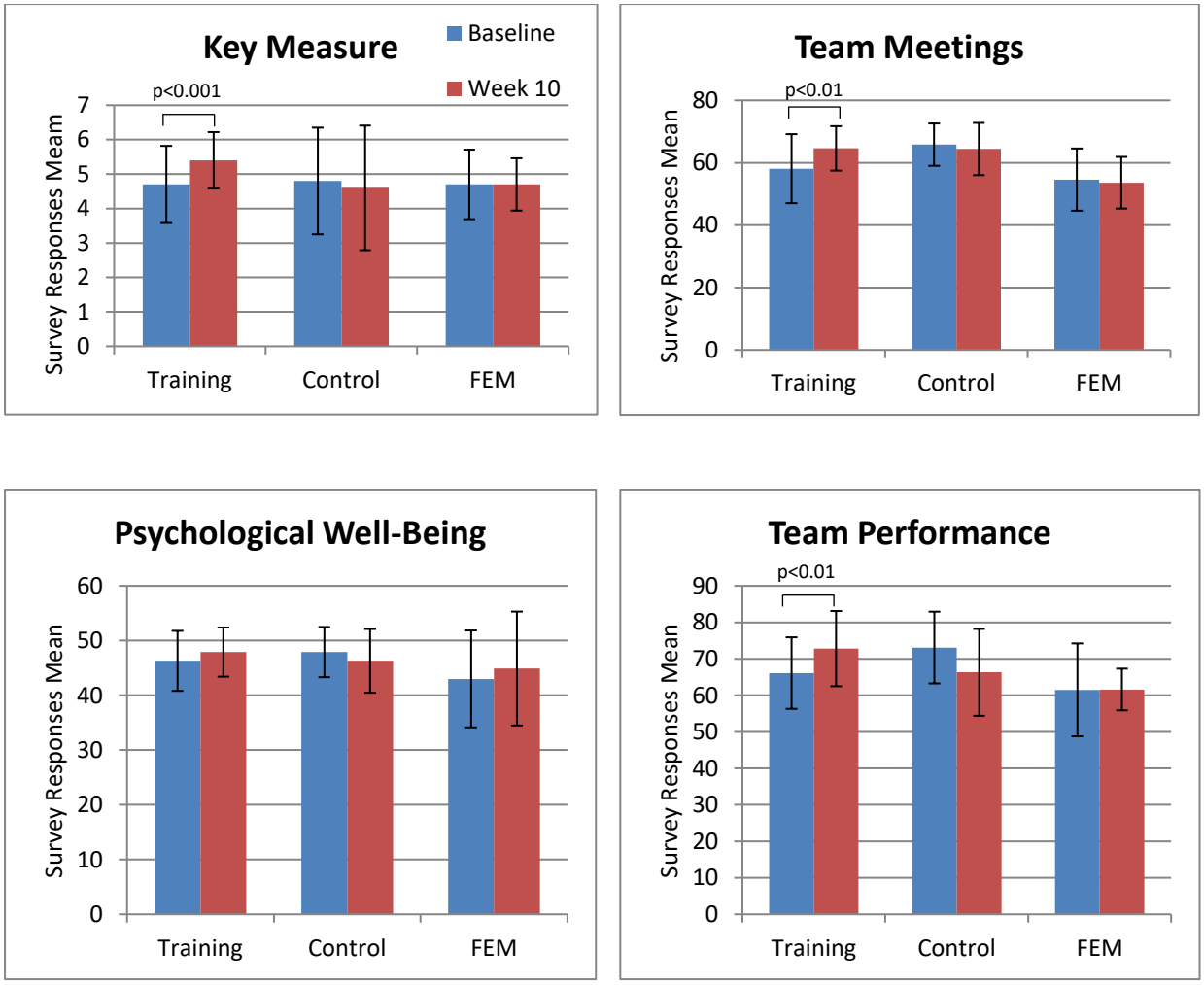

Figure 2. Mean CFB by Measure

P-value is from a one sample t-test to test if the mean CFB is significantly different from zero.

Due to a lack of follow up responses in the control & FEM group, the results of the t-test were confirmed using the non-parametric Wilcoxon signed rank test to ensure the sparse data in these groups did not affect the results of the analysis. Non-parametric results were consistent with the results of the parametric t-test. For simplicity, only t-test results are reported.

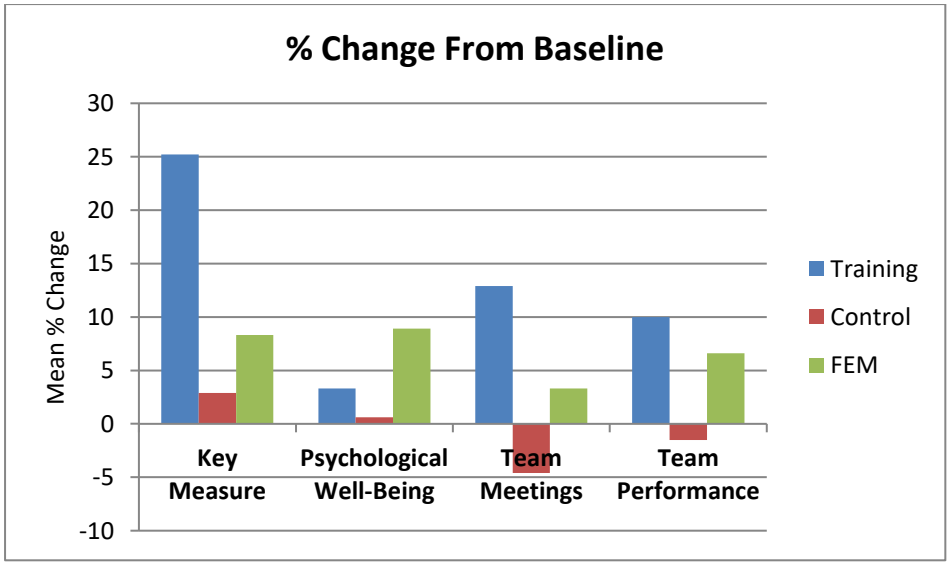

Figure 3. Percent CFB by Measure

Percent CFB are shown above in Fig 3 and represent the *relative change,* so that comparisons between measures can be made. The greatest mean CFB was seen for the **key measure** in the training group, which showed an increase of 25.2%, followed by **team meetings** at 12.9% and **team performance** at 10%. The FEM group showed increases of 8.9% (psychological well-being), 8.3% (key measure), 6.6% (team performance) and 3.3% (team meetings). The control group showed little or negative increases.

Percent CFB within Team Meetings & Team Performance Sub-Measures

Survey questions within **Team Meetings** and **Team Performance** were sub-categorized to permit further analysis (see S6 and S7).

Fig 4 below shows the relative CFB of these sub-measures within **Team Meetings**. The absolute CFB (see S6) showed statistically significant improvements within the Training group for the Team Meeting sub-measures of **Creativity** (P<0.01), **Effectiveness** (P<0.01) and **Engagement** (P<0.01) and with **Attention** being close to significance. The control group showed negative change. The comparison group showed some increases in Creativity, Effectiveness and Engagement, although not statistically significant.

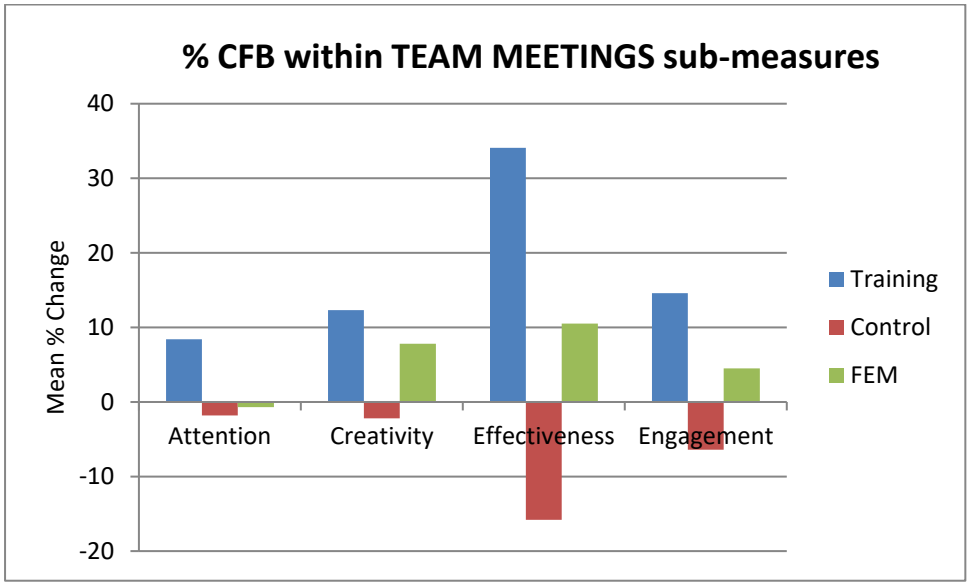

Figure 4. Percent CFB within TEAM MEETINGS Sub-Measures

The relative CFB within the sub-measures of **Team Performance** can be seen in Fig 5 below. The absolute CFB (see S7) showed statistically significant improvements within the training group for the Team Performance sub-measures of Lack of **Commitment** (p<0.05), Fear of **Conflict** (p<0.001) and Absence of **Trust**(p<0.001), but not for Avoidance of Accountability or Inattention to Results. The control group showed little or negative change. The FEM comparison group showed relative increases in Commitment, Conflict and Trust, with Commitment and Trust being higher than the training group, although not statistically significant.

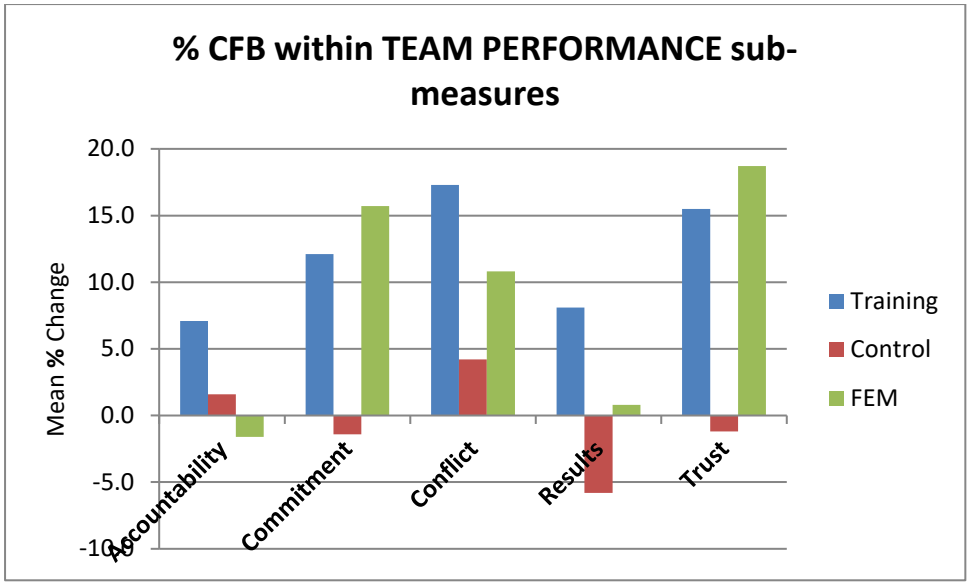

Figure 5. Percent CFB within TEAM PERFORMANCE Sub-Measures

Comparison of Subject Group Results

The training group was compared to the control and FEM groups to test if the mean CFB was significantly different between the two groups. Fig 6 shows the training group CFB was significantly greater than the control group for the **team meeting** measure (P<0.05). None of the other comparisons were significant.

P-value[1]	Training vs. Control	Training vs. FEM
Key Measure	0.1006	0.2571
Psychological Well-Being	0.2281	0.2511
Team Meetings	**0.0178***	0.3064
Team Performance	0.1241	0.5874

Note: These results should be interpreted with caution due to small control & FEM group sample sizes. A more complete follow up response, particularly in the control group, may have increased the statistical power to detect a true difference.

Figure 6. Comparison of Subject Groups for Each Test

[1]P-value is from an exact Wilcoxon two-sample test instead of a two-sample t-test, owing to the small number of subjects who completed the follow up survey in the control group and the FEM group.
Statistically significant result: *P<0.05

Correlation of Measures Within the Training Group

	1	2	3	4
(1) **Key Measure**				
(2) **Psychological Well-Being**	0.06			
(3) **Team Meetings**	0.30	**0.46***		
(4) **Team Performance**	0.32	0.16	**0.49****	

Figure 7. Correlation of Measures within the Training Group

P-value is from a Spearman's rank correlation test and results are based on the change from baseline. N=30
Statistically significant results: *P<0.05 **P<0.01.

Fig 7 above shows the correlation (r) between the different CFB measures for the training group. Both **team performance** and **psychological well-being** were significantly correlated with **team meetings** although both had a correlation coefficient of approximately 0.5, indicating only a moderately strong relationship.

Qualitative Survey Question Responses

Responses to qualitative questions were ranked by both valence (whether generally positive, negative or mixed) and by specific keywords or themes. Fig 8 shows the CFB comments valance. Again, small sample sizes for Control and FEM groups limits a robust comparison.

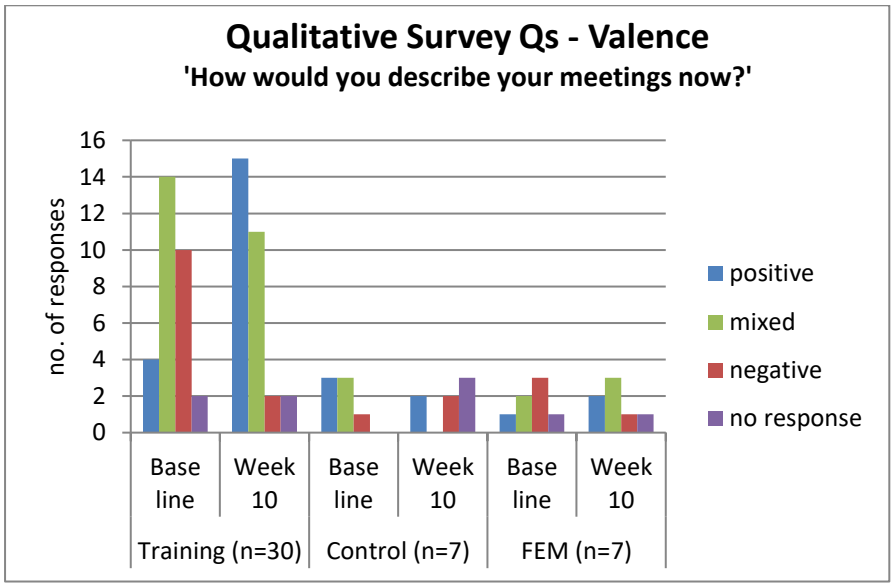

Figure 8. Qualitative Survey Question Reponses - by Valence

Within the training group, positive comments increased have increased three-fold, whilst mixed and negative responses have both declined. The FEM comparison group shows a similar pattern, whilst the contol group shows a worsening pattern.

To the additional follow up question "What, if any changes have you seen in your team &/or team meetings since the training?" within the training group 63% of responses were positive, 27% mixed and 10% N/A, compared to the FEM group where 43% were positive, 14% mixed, 29% negative and 14% N/A. The control group was not asked this question.

Fig 9 below shows the qualitative responses by keyword or theme, for items with more than 4 mentions. Small sample sizes meant only the Training group results met this criteria. A keyword or theme can be mentioned either positively or negatively.

'Overall, how would you describe your team meetings now'?						'What, if any, changes have you seen in your team &/or team meetings since the training?'	
Training Grp (Baseline)			**Training Grp** (Follow Up)			**Training Grp** (Follow Up)	
Negative		**Positive**		**Negative**	**Positive**	**Negative**	**Positive**
No or inadequate Agenda	5	Organised, focused or structured	6	-	Effective 7	-	No interrupting 9
Inadequately discussed issues	5	Trust or team Spirit	5	-	Inclusive. Everyone involved 7	-	Organised, focused or structured 7
No Actions or follow ups	5	Clear purpose	4	-	Short adequate length 5	-	Inclusive. Everyone involved 7
Disorganised, unfocused or unstructured	4	Informative	4	-	Organised, focused or structured 5	-	Short or adequate length 4

Figure 9. Training Group Qualitative Responses – by Keyword (>4 mentions)

At baseline, training group participants show contradictory meeting opinions, some saying meetings are structured, others saying not etc. This demonstrates normal variability in meeting quality. At follow up, the views appear more consistent, with no negative themes. The comments suggest meetings have become more **effective**, **inclusive**, **shorter**, more **focused**, and most significantly with **less interrupting**.

Sample positive qualitative responses:

- *A more relaxed yet productive environment. Generally shorter and more punctual in terms of start & finish. A better adherence to topic under discussion with fewer departures off topic*
- *There are shorter, fewer agenda items, more in-depth treatment of agenda items as a result. More listening and people trying harder to contain themselves and not interrupt others. Snappier.*
- *Less stressful because you get to talk, the pace of the meeting has slowed down somewhat yet somehow more gets said and they often finish early giving you more time for the next task.*

Managers' Results

Fig 10 shows the key measure by team mean and related manager score, for the six teams. Higher manager scores, in comparison to the team mean, seem to confirm self-serving managers' bias findings[55], whereby managers rate their meetings higher. Two interesting exceptions though are Teams 2 and 4, where the managers scored the key measure lower than their own team at baseline and then failed to complete the follow up survey. If such a scoring pattern were an indicator of possible team dysfunction, it could be a useful tool for early detection. As such, it is worthy of further investigation.

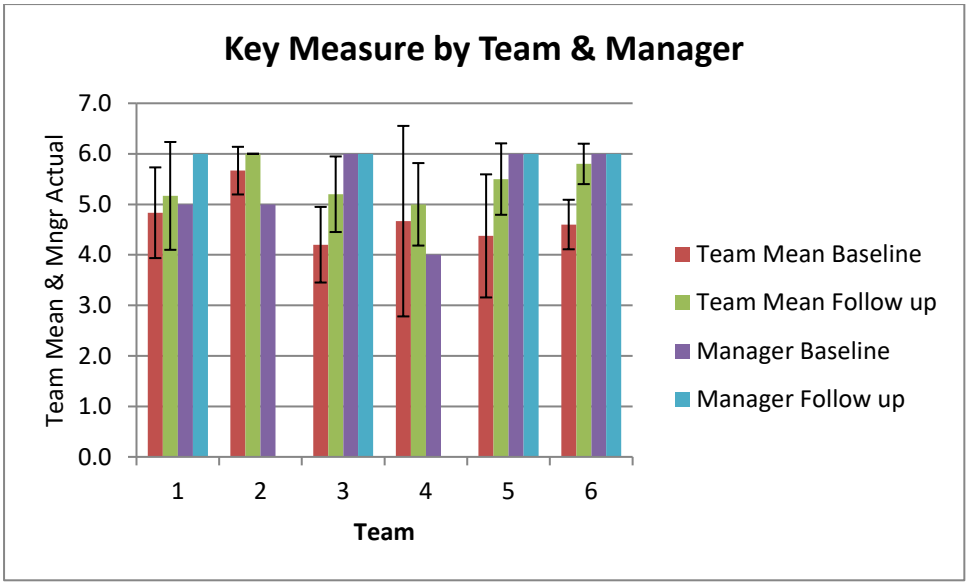

Figure 10. Key Measure by Team & Manager

All qualitative manager responses were positive, with repeating themes of **engagement**, **focus**, **inclusion**, **listening** and **shorter**. Sample manager responses:

- *More engaged. Less confrontational. Certainly recognize the other site meetings that haven't benefitted from the training!*
- *Tighter discussions more action oriented.*
- *Our meetings are productive and critically a lot shorter ... The ability to have a 15min meeting which previously took 45 has improved things immensely.*

Follow Up Benefits

At follow up, training groups and managers were also asked whether the training had benefitted them. Fig 11 below shows that the training group individuals noted multiple benefits with their managers scoring higher, most notably on the team benefits question.

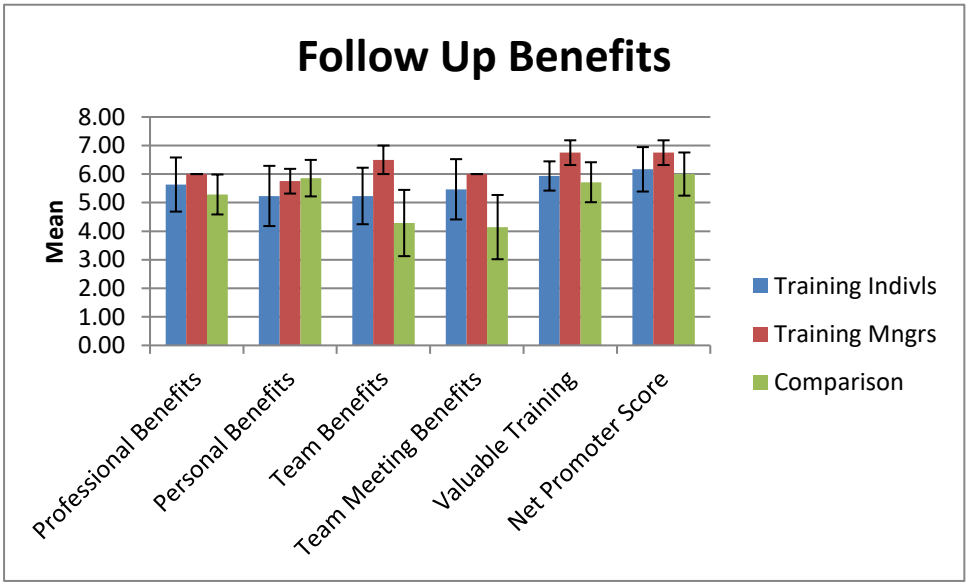

Figure 11. Follow up Benefits

The FEM comparison group scored themselves lower across all categories, most notably team meeting benefits, but with the exception of personal benefits, suggesting their training provided more individual, rather than team benefits. This appears consistent with their lower seniority and inability to influence team meetings and given they weren't a complete team.

Discussion

Findings

This pilot found statistically significant self-reported improvements in the **key meeting measure** ('Overall, how do you rate your team meetings'?), (satisfaction with) **team meetings** and **team performance** for the training groups. Within sub-measures, there were significant improvements in **Creativity**, **Effectiveness** and **Engagement**, with borderline Attention, in addition to **Commitment**, **Conflict** and **Trust**, but not Accountability or Results.

Psychological well-being did improve for both training and FEM groups but did not reach statistical significance. Reaching the end of a restructuring period and/or being more junior by banding or more gender balanced may have contributed to FEM's increase, with early career training possibly being relatively more confidence building and impactful. The sub-categories of Commitment and Trust increased beyond that of the training group, but none reached statistical significance.

The control group showed little, no or negative improvements across all measures.

Thus, with positive and significant findings across numerous measures and qualitative follow up comments such as **no interrupting**, **effective**, **shorter**, **inclusive** and **organised**, the training did positively impact subsequent team meetings, making them shorter, more effective and generally smarter. With results possibly impacted by small sample sizes however, further research with larger samples would be necessary to permit a truer comparison.

Within the training group, the significant, although only moderately strong correlation between **psychological well-being** and **team meetings** supports prior findings[18] that meetings impact employee well-being. The significant, but moderately strong correlation between **team meetings** and **team performance** suggests a linkage. Either, more satisfying team meetings increase team performance and psychological well-being. Or, training improves team performance, making meetings more satisfying as a result, thus improving psychological well-being. Or, the training marginally improves psychological well-being which subsequently improves performance. Causality cannot be determined at this stage.

But does such training really improve effectiveness and outcomes, given that for both FEM and training groups, the behaviour based sub-measures of trust and commitment scored considerably higher than the outcome based ones such as effectiveness, accountability and results? Research[1] suggests that the more socially sensitive, turn-taking groups achieve higher collective intelligence scores. Thus, in line with the Thinking Environment[4] concept, perhaps collective trust, response flexibility and the right behaviours do need to be in place first, with outcomes following later. Further studies would be needed to confirm how much time is needed for outcomes to follow or if other factors are necessary, such as training entire departments.

FEM vs Training

Although not aiming to assess the FEM programme and hindered by small sample sizes, why might the half day training class seemingly outperform the 2 day FEM class, given FEM does include similar idea generation tools such as 'round robin', 'brainstorming' and 'brainwriting'?

The answer may lie in the content emphasis. FEM focuses on improving meeting outcomes through more effective meeting processes and design characteristics, such as structure and agenda. Participants are deemed part of the process, with the aim of running a smooth meeting and avoiding disruptive behaviours. Brain states are not considered. In contrast, meeting design elements were virtually ignored for the training groups. Albeit rounds are a disciplined process, they simply provide the 'rules' within which a brain optimising environment can occur.

Meetings or trainings that seek to minimise threat responses and create positive 'toward states' do of course feel inherently more pleasurable and less stressful and this in itself may have influenced the results, as may the duration of the training; with shorter distributed lessons being more easily remembered and applied[62].

Being part of a 'special' researcher-led training may also have encouraged more attention than normal to the training groups' content, as may having a trainer enthused about the content.

Turn-taking vs Mentalizing

The collective intelligence[1] [3] research suggests that every-day mindreading, or mentalizing, is the key predictor of a group's intelligence, in addition to turn-taking. But which element creates causality in real work-place meetings?

Does mentalizing give you the social sensitivity and awareness to overcome the urge to respond, permitting turn-taking, which then creates space for better thinking? Or does turn-taking give you the thinking space to listen, within which you can then mentalize, better able to spot nuances and understand others' viewpoints, leading to more diversity of thought?

Or viewed another way, which would have the most negative impact on a meeting; having excellent mentalizing abilities, but dominating and interrupting the meeting, or demonstrating great turn-taking, but not understanding other viewpoints? Arguably, the former might impact group thinking the most, with the latter being more of a regular meeting annoyance. Perhaps therefore, turn-taking needs to come first, using the process of rounds, to generate the space for mentalizing.

Follow Up Research

More research would also be necessary to examine related questions such as:

Are there fewer resulting meetings (given it is the number[17] rather than duration of meetings that is problematic)? Are meetings really shorter, or do efficient and social meetings just feel shorter? Was the training group session just more experiential and bonding than FEM? How is multitasking in meetings impacted? Which element of the training group theory was most impactful, i.e. the brain theory or the practical turn-taking? How big was the Hawthorne effect, or the impact of being studied? How rapid was the impact of change – would an immediate post class survey have detected change? What is the impact of class duration – are shorter trainer classes more engaging or effective? How might the results be impacted by variables such as gender, generation, organisational

culture/mind-set, team sizes or team relationships? Do complex organisational structures and adaptive virtual teams impact employees' perceived sense of 'home' or belonging within the organisation? How does this affect performance and how is this impacted by ways in which groups meet? Are the findings replicable for teams who meet virtually? Are the results sustainable and for how long? Are the results replicable when delivered by other trainers or delivered virtually?

Conclusion

Hyper charged innovation within an uncertain world requires adaptive, nimble and shape-shifting teams. The bar on collective competence and creativity is therefore rising. In this information age, meetings are meant to be the engine of workplace productivity, but research suggests they are still costly and unproductive on one hand, yet essential and increasing in number and duration on the other. Often symbolic of the organisational culture itself, meetings have a powerful influence on both corporate success and employee lives, in addition to impacting customers and populations too.

This study suggests that altering meeting behaviours through practically applying collective intelligence research findings on turn-taking and mentalizing, in effect making them more 'brain-friendly', may result in shorter, smarter and more satisfying meetings. In this safer, trusting and more prosocial environment, such mindful meetings may improve team performance and even well-being.

Applying a few meeting rules such as rounds to bring the groups' attention to its own responses and internal states, may provide a breaking system to minimise bias, group think, dominance and social loafing, whilst increasing identity, engagement, cohesion and creativity. Removing the human ego as much as possible from decision making may help protect groups from their own naturally occurring cognitive weaknesses.

For the working population required to navigate work and customer outcomes amidst the relentless daily tide of meetings, the good news is that meetings can become more inspiring and empowering simply by focusing on the human aspect of them. Real authentic human connection gets results. So in line with Caveman Principles[63], perhaps the more high tech our meetings become, the more high touch they need to be too.

Ultimately we are all imperfect and irrational beings, clouded by biases, so to make better corporate decisions we may be wiser to try to change our meeting environments, rather than to hope we can change ourselves.

Giving Edison the final words:

"The most necessary task of civilization is to teach people how to think."

"Discontent is the first necessity of progress."

"There's a better way to do it. Find it."

References

[1] Woolley AW, Chabris CF, Pentland A, Hashmi M, Malone T (2010). Evidence for a Collective Intelligence Factor in the Performance of Human Groups. *Science* Vol 330

[2] Woolley A & Malone T (June 2011). What makes a team smarter? More Women. *HBR*.

[3] Engel D, Woolley AW, Jing LX, Chabris CF, Malone TW (2014) Reading the Mind in the Eyes or Reading between the Lines? Theory of Mind Predicts Collective Intelligence Equally Well Online and Face-To-Face. *PLoS ONE* 9(12): e115212.

[4] Kline N (1999). The Thinking Environment® & Transforming Meetings®. *Time to Think*. Cassell. www.timetothink.com

[5] Findings and resources from *The NeuroLeadership Institute*. www.NeuroLeadership.com

[6] Kayser TA (1995). *Mining group gold: how to cash in on the collaborative brain power of a group*. Irwin

[7] Schwartzman HB (1986). The meeting as a neglected social form in organizational studies. *Research in Organizational Behaviour*

[8] MCI (1998). *A Verizon Conferencing White Paper. Meetings in America: A study of trends, costs and attitudes toward business travel, teleconferencing, and their impact on productivity*. https://e-meetings.verizonbusiness.com/global/en/meetingsinamerica/uswhitepaper.php

[9] Tobia PM & Becker MC (1990). Making the most of meeting time. *Training & Development Journal*, 34, 34-38

[10] Monge PR, McSween C & Wyer J (1989). *A profile of meetings in Corporate America: results of the 3M meeting effectiveness study.* Annenberg School of Communications, University of Southern California,

[11] Romano NC & Nunamaker JF (2001). *Meeting analysis: Findings from research and practice, Proceedings of the 34th Hawaii International Conference on System Sciences 2001*

[12] Mosvick RK & Nelson RB (1987). *We've got to start meeting like this! A guide to successful business meeting management*. Scott Foresman

[13] Murphy M (2013). *No More Pointless Meetings*. AMACOM, a division of American Management Association

[14] Sheridan J H (1989). A $37 billion waste. *Industry Week* 238, 11-12. Based on a Harrison-Hofstra survey.

[15] Centre for Economics and Business Research (Cebr) (2012) for Epsom. *Wasted time in meetings costs businesses £26billion*. http://www.newstatesman.com/business/business/2012/05/wasted-time-meetings-cost-economy-%C2%A326bn-2011

[16] Fuze.com (2014) *The ugly truth about meetings (Infographic).* http://blog.fuze.com/infographic-ugly-truth-about-meetings/

[17] Luong A, Rogelberg SG (2005). Meetings and more meetings: The relationship between meeting load and the daily well-being of employees. *Group Dynamics: Theory, Research and Practice* 9, 58-67,

[18] Rogelberg SG, Leach DJ, Warr PB & Burnfield JL (2006). "Not another meeting!" Are meeting time demands related to employee well-being? *Journal of Applied Psychology*, 91, 86-96

[19] Rogelberg SG, Allen JA, Shanock L, Scott C & Shuffler M (2010.) Employee satisfaction with meetings; A contemporary facet of job satisfaction. *Human Resource Management* 29, 149-172

[20] Shanock LR, Allen JA, Dunn AM, Baran BE, Scott CW & Rogelberg SG (2013). Less acting, more doing: How surface acting relates to perceived meeting effectiveness and other employee outcomes. *Journal of Occupational and Organizational Psychology*, 86, 457-476

[21] Doyle M & Straus D (1982). *How to make meetings work: the new interaction method*. Jove Books

[22] Microsoft (2013) by YouGov. *Too many meetings, too much information*. http://www.microsoft.com/en-gb/news/Press/2013/Nov13/Toomanymeetingstoo.aspx

[23] Lencioni P (2004). *Death By Meeting*. Jossey-Bass

[24] Gallup Inc (2013). *State of the American Workplace 2013*. http://www.gallup.com/services/178517/state-global-workplace.aspx

[25] Leach DJ, Rogelberg SG, Warr PB & Burnfield JL (2009). Perceived Meeting Effectiveness: The Role of Design Characteristics. *Journal of Business Psychology*, 24, 65-76

[26]Rogelberg SG, Barnes-Farrell JL, Lowe C (1992). The stepladder technique: A structure facilitating effective group decision making. *Journal of Applied Psychology*, 5, 730-737

[27] Rock D, SCARF, a brain-based model for collaborating with and influencing others. *Neuroleadership Journal*. 1. 2008

[28] Sy T, Côté S, Savedra R (2005). The Contagious Leader: Impact of the Leader's Mood on the Mood of Group Members, Group Affective Tone, and Group Processes. *Journal of Applied Psychology*, Vol 90(2), 295-305

[29] Barsade SG (2002). The ripple effect: Emotional contagion and its influence on group behaviour. *Administrative Science Quarterly* 47.4 (2002): 644-675.

[30] Barker A (2007). *How to Manage Meetings*. Kogan Page
[31] Mani A, Mullainathan S, Shafir E, Zhao J (2013). Poverty impedes cognitive function. *Science* 341, 976
[32] Iacoboni M (2009). Imitation, empathy, and mirror neurons. *Annual Review of Psychology*, 60, 653-670.
[33] Kahneman D, *Thinking Fast and Slow* (2011) FSG
[34] Lieberman MD (2007). Social cognitive neuroscience: a review of core processes. *Annual Review of Psychology*, 58, 259-289.
[35] Lieberman MD, Rock D, Cox CL (2014). Breaking Bias. *NeuroLeadership Journal*, 5
[36] Jung-Beeman M, Collier A, Kounios (2008). How insight happens: learning from the brain. *NeuroLeadership Journal*, 2008
[37] Eblin Scott (2014). *Overworked and Overwhelmed*. Wiley.
[38] Holacracy Governance Meetings: *http://holacracy.org/how-it-works*
[39] Lieberman MD (2013). *Social: Why our brains are wired to connect*. Oxford University Press
[40] Baumeister RF & Leary MR (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497.
[41] Kahneman D, "Experienced utility and objective happiness: a moment-based approach", in *Choices, Values and Frames*, D. Kahneman and A. Tversky (eds), New York: Cambridge University Press
[42] Dirks KT & Ferrin DL (2001). The Role of Trust in Organizational Settings. *Organization Science*, 12(4), 450-467
[43] Kirsch P, Esslinger C, Chen Q, Mier D, Lis S, Siddhanti S, ... & Meyer-Lindenberg A. (2005). Oxytocin modulates neural circuitry for social cognition and fear in humans. *The Journal of Neuroscience*, 25(49), 11489-11493.
[44] Spunt RP & Lieberman MD (2013). The busy social brain evidence for automaticity and control in the neural systems supporting social cognition and action understanding. *Psychological Science*, 24(1), 80-86.
[45] Frankl V (2004). *Man's Search for Meaning*. Rider.
[46] Siegal D (2012). *The Developing Mind. How Relationships and the Brain Interact to Shape who we are*. Guilford
[47] Bolte-Taylor J (2008). *My Stroke of Insight*. Penguin Publishing Group
[48] Berkman ET, Burklund L & Lieberman MD (2009). Inhibitory spillover: Intentional motor inhibition produces incidental limbic inhibition via right inferior frontal cortex. *Neuroimage*, 47(2), 705-712.
[49] Lieberman MD, Eisenberger NI, Crockett MJ, Tom SM, Pfeifer JH & Way BM (2007). Putting feelings into words affect labelling disrupts amygdala activity in response to affective stimuli. *Psychological Science*. 18(5), 421-428.
[50] Buhle JT, Silvers JA, Wager TD, Lopez R, Onyemekwu C, Kober H, ... & Ochsner KN (2014). Cognitive reappraisal of emotion: a meta-analysis of human neuroimaging studies. *Cerebral Cortex*, 24(11), 2981-2990.
[51] Kross E & Ayduk O (2011). Making meaning out of negative experiences by self-distancing. *Current Directions in Psychological Science*, 20(3), 187-191.
[52] Arnsten AF (2009). Stress signalling pathways that impair prefrontal cortex structure and function. *Nature Reviews Neuroscience*, 10(6), 410-422.
[53] Jung RE, Mead BS, Carrasco J & Flores RA (2013). The structure of creative cognition in the human brain. *Frontiers in Human Neuroscience*, 7.
[54] Fink A & Benedek M (2014). EEG alpha power and creative ideation. *Neuroscience & Biobehavioral Reviews*, 44, 111-123.
[55] Cohen MA, Rogelberg SG, Allen JA, Luong A (2011). Meeting design characteristics and attendee perceptions of staff/team meeting quality. *Psychology Faculty Publications*, 96
[56] Deiner E & Biswall-Deiner RB (2009). *The Flourishing Scale* (FS). Copyright by E Deiner & RB Biswall-Deine (2009). http://internal.psychology.illinois.edu/~ediener/FS.html
[57] Lencioni Patrick M (2002). *Five Dysfunctions of a Team*. Copyright Wiley & Sons
[58] *The Five Behaviours of a Cohesive Team, Research Report*. Copyright Wiley & Sons 2014 http://www.fivebehaviors.com/UserFiles/Five%20Behaviors_Research%20Report%200614.pdf
[59] *The Five Behaviours of a Cohesive Team®*. www.fivebehaviors.com. Copyright Wiley & Sons 2014
[60] Clark A, Oswold A, Warr P (1996). Is job satisfaction U shaped in age? *Journal of Occupational and Organizational Psychology* 69, 57-81
[61] Ferris GR, Bedeian AG, Kacmar KM (1992). Age tenure and job satisfaction: A tale of two perspectives, *Journal of Vocational Behavior*, 40, 33-48.
[62] Dempster FN (1988). The spacing effect: A case study in the failure to apply the results of psychological research. *American Psychologist*, 43(8), 627.
[63] Kaku M (2011). *Caveman Principle*. https://www.facebook.com/notes/michael-davis/cave-man-principle-written-by-michio-kaku/213732898648359