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Compassion on university degree programmes at a UK university

The neuroscience of effective group work

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Abstract

Purpose – The purpose of this paper is to explore the neuroscience that underpins the psychology of compassion as a competency. The authors explain why this cognitive competency is now taught and assessed on modules of different degree subjects in a UK university.

Design/methodology/approach – The paper is divided into first, an exploration of recent psychology and neuroscience literature that illuminates the differences, and relationship, between empathy and compassion for safeness building in teams. Within that, the role of oxytocin in achieving social and intellectual rewards through the exercise of cognitive flexibility, working memory and impulsive inhibitory control (Zelazo *et al.*, 2016) is also identified. The literature findings are compared against relevant qualitative data from the above university, so far, nine years of mixed methods action research on compassion-focussed pedagogy (CfP).

Findings – These are the concept and practice of embedding compassion as an assessed cognitive competency in university group work is illuminated and rationalised by research findings in neuroscience.

Research limitations/implications – The limitations of the study are that, so far, fMRI research methods have not been used to investigate student subjects involved in the CfP now in use.

Practical implications – The paper has implications for theory, policy and practice in relation to managing the increasing amount of group work that accompanies widening participation in higher education (HE).

Social implications – The social implications of what is outlined in the paper pertain to student mental health, and academic achievement; to policy and practice for HE curriculum design across subjects and disciplines; and for the HE remit to serve the public good.

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Originality/value – A review of this kind specifically for student assessed group and its implications for student academic achievement and mental health has not, apparently, been published.

Keywords Assessment, HE, Compassionate, Intelligent group work, Micro skills

Paper type Conceptual paper

Introduction

Duhigg (2016) reports in a study by Google of 180 teams amongst its 55,000 employees. The purpose was to identify the key feature(s) of the “perfect” team. What factors defined the most resilient and best-performing teams in the company? Starting in 2012, the multi-million dollar study, Project Aristotle, could find no common variables, no patterns or key features of the most resilient and innovative teams, except for one lead. All teams seemed to have their own internal “norms of team behaviour”. Project Aristotle directed its attention to investigating the behavioural norms of the company’s outstanding teams. It was found that in these teams, members made each other feel safe, and it was two safeness-building behaviours in particular that seemed to “raise the collective group intelligence” (Duhigg, 2016). The first one was that members shared speaking time together equitably. Second, they were “skilled at intuiting how others felt based on their tone of voice, their expressions and other nonverbal cues” (Duhigg, 2016). At the same time, in other teams, it was found that “collective intelligence declined” where either or both of these “norms” were not in place “even if, individually, all the members were exceptionally bright” (Duhigg, 2016). In particular, over talking – monopolising – in team discussions by one or two members “hobbled” the collective thinking processes (Duhigg, 2016).

In student group work in higher education (HE) too, the collective intelligence can be reduced when an individual, wittingly or unwittingly, monopolises. At the same time, instrumentally helped by the monopoliser, other students may contribute very little to the group’s efforts to think together. No matter how much both behaviours can turn out, in students’ private narratives, to be resented (Gilbert, T., 2012) both behaviours can become “norms” in a group, particularly in the individualistically competitive environment of an increasingly, neoliberal HE sector. Both of these behaviours demonstrate major communicative difficulties within teams. They block the group’s access to the multiple perspectives that feed collective intelligence building.

Students’ use of compassionate micro skills in HE team work

In the UK’s University of Hertfordshire, students on some degree modules in some departments – the Humanities, Business and Computer Science – are assessed on their individual use of the micro skills of compassion. Compassion is understood in very similar terms in neuroscience (Colonello *et al.*, 2017; Klimecki *et al.*, 2014; Weng *et al.*, 2013; Immordino-Yang *et al.*, 2009), psychology (Gilbert, 2005, 2017a; Bates, 2005); and, anthropology (Spikens, 2017; Goetz *et al.*, 2010; Feather, 2006) to mean the noticing of distress or disadvantaging of self or others and a commitment to reduce or prevent it. This is not the same as empathy although the neural circuitry for empathy may be recruited into that for compassion, as discussed below.

Training in compassion-based micro skills for task focussed, face-to-face student group work is provided in a short workshop at the beginning of a participating module[1] (Gilbert, T., 2012, 2016a, b, 2017b) (see also three examples of the micro skills: Table A1). Each of the skills, or techniques, is theoretically underpinned and evidence based, yet they are not intended to be prescriptive or inflexible. They are simply to help students practise and demonstrate, on the hoof, the rapid cognitive processing that keeps the group optimising the learning and social experiences of all its members. Many of these skills are non-verbal. An example is the compassionate management of one’s own and others’ eye gaze in the group – inclusive, excluding or avoidant eye gaze (Gilbert, T., 2017b).

The whole repertoire of group micro skills overall, derived from the cross-disciplinary scholarship on compassion, has been assembled through action research over a number of

years. So far, ($n = 830$) students and ($n = 15$) tutors have been involved in the studies (Gilbert, 2012, 2016a, b; 2017a, b, 2018). A typical application of these assessed skills is in small, research-based discussion groups in seminars or tutorials: each student presents an article he/she has selected from his/her independent reading, and then joins a critical discussion of it with the whole group, usually of about four students. The reading will often be on a tutor-agreed topic, e.g., from the previous lecture.

Overall, in contrast to control groups, the compassion-focussed pedagogy (CfP) described above, appears to have had three effects (Gilbert, T., 2012, 2016a, b; 2017b).

The first is an apparently enhanced social interconnectivity between students, including in relation to student interculturalising processes (Zapata-Barrero, 2013; Cante, 2011). This was evident from micro-ethnographic analysis of films of assessed student discussions; loosely structured student interviews and focus groups; surveys; and from field note observations of in-class control and intervention group discussions.

The second effect, again in contrast to control groups, appears to have been in relation to learning experience. Data for this came from the above interviews and focus groups (students ($n = 34$); teaching staff ($n = 12$); external examiners ($n = 3$)) and from analysis of assessment feedback and external examiners' reports.

The third effect appears to have been related to academic performance. Statistical analysis of this was carried out at the host university and blind, at the Royal Veterinary College, University of London, for a participating module of ($n = 38$) business students (Gilbert, T., 2016a, b). This was repeated when a statistical analysis of academic performance was carried out at the host university and blind at the University of Hertfordshire for a participating module of ($n = 220$) computer science students (Gilbert, 2018) (in this case, the CfP was embedded under the auspices of the Social Experience and Emotionally Intelligent Learning research project run in the Computer Science department by Doolan).

Findings replicated in both departments were that there was no statistically significant evidence of a BME attainment gap, whereas in the controls for each department the attainment gap was similar to the UK HE national average[2]. The Business and Computer Science departments both have notable diversity of students with large numbers of BME students on their modules. The host university's proportion of BME students (including international students) is approximately 50 per cent compared to white local students, partly explained by its proximity to London.

This paper draws on a neuroscience perspective on how and why embedding even brief, evidence-based training of students on the theoretically informed micro skills of compassion, for their use in assessed group work, seems to be associated with the above effects. It draws on qualitative data from the above research to help illuminate this exploration. First, a brief context is set for a key issue that the research has sought to address.

The individual vs the group

In HE's wider context, Chickering (2010) points to an increasing neo-liberalisation of the HE sector that seduces and pressurises students into normalising the notion of private enterprise, and competitive individualism at the expense of other priorities. One of these neglected priorities says Chickering, is HE's primary remit: to serve the public good. At the same time, HE encourages students to become leaders through competitive individualism (Marturano *et al.*, 2010), and to do this can mean being not just different, but better than others in some respect. Self-esteem depends on this (Kingston, 2008; Neff, 2003).

Self-esteem: striving for failure

Self-esteem – the measuring of oneself in some aspect of performativity, against the performance of others (Neff, 2003) – adds to the problematic nature of many students' experiences of HE. Self-esteem is a poor substitute for deliberative, measured, self-compassion

(Neff, 2003) which centres on noticing one's own distress and committing to reduce it in wise (Gilbert, P., 2017a) ways. This requires some degree of distress tolerance (c.f. resilience) in order to make rational decisions about what to do. The difficulty is that many students are derailed in their educational experiences away from their internal development in this area, and towards the dopamine-dependent (therefore often short term) rewards of episodes of high academic self-esteem.

Self-compassion and its cognitive implications

Self-compassion calls on incisive cognitive work to be done so that irrationalities in assessing the self can be identified, quarantined and dismantled. It is illogical to offer words of encouragement and support to a friend who is feeling inadequate and then unquestioned abuse to oneself when in the same situation. Many students do both. The point of self-compassion is to notice, to pin down and interrogate such anomalies, not normalise them. A high-achieving student in the host university for the above studies, was upset that she had left a planned paragraph out of her latest third-year history essay. As was usual for her, the essay had been graded as a 1st – the highest achievement band – but she was crying in the academic skills tutor's office. She was stupid, she said; she wanted to kick herself. Her tone when she spoke to/about herself in this way was hostile and cold. At the same time, she could not be encouraged to share the experience of her human mistake with her friends for their support, because this would make her feel worse she said. Despite efforts to reduce her anxiety and repair her self-esteem, she left the office still upset and self-critical.

Self-esteem is irrational and unsustainable (Neff, 2003). One can be overtaken as the smartest, the best looking, the most talented, the thinnest, the fastest (whatever the chosen measure of performance is) at any moment. In a sample of ($n = 103$) students of a university in London, Kingston (2008) identified that those who were high academic achievers and had related high self-esteem were, surprisingly, at greater risk of not completing their degrees than many of their peers who were not such seasoned academic achievers. In her survey and interview-based study, Kingston found these high-achieving students tended to seek maintenance of their high self-esteem from what she terms, external loci of control: tutor feedback, exam and coursework results, for example. They tended not to value fellow students for validation or support. In particular, Kingston found that they were the most likely to drop out, compared to those of their fellow students who turned, not just to tutors, but to their peers too for reassurance and validation (Leahy, 2005) during their programmes.

Additional literature from clinical psychology cites other problematic linkages with self-esteem. Two of them – narcissism (Bushman and Baumeister, 1998) and prejudice (Aberson *et al.*, 2000) – have direct implications for HE seminar interactions, for example, through monopolising (Yalom and Leszcz, 2005), and stereotyping and other heuristic thinking (Pitner and Sakamoto, 2005), respectively.

In his model of three types of affect regulation, P. Gilbert (2005, 2017a) suggests that purposeful, thoughtful, deliberative self-compassion (with warm, not harsh tone and intention towards the self) stimulates a self-soothing system in the brain. This helps mediate the two other systems in his model: the drive system[3] (associated with dopamine); and, most importantly, the threat system. Without the mediating effect of the (trainable) self-soothing system, the brain can enter into loops of oversensitivity to threat from which it cannot escape (Gilbert, P., 2005, 2017a). In the current climate of HE (Chickering, 2010), this can lead to excessive rumination on potential to fail, and then to anxiety and depression. As for the student described above, this can be underpinned by a sense of being unconnected to others or to their (often shared) distress.

Students often do not feel safe when they are encouraged to invest so much of their identity in their personal social performance and academic achievement. Neff *et al.* (2007) share a common finding of Rude *et al.*'s (2004) study, and with studies by Sillars *et al.* (1997)

and Stirman and Pennebaker (2002). All three studies of people's self-talk, identified that "the use of first person plural pronouns and social references is linked to lower levels of depression and better relationships, while the use of first person singular pronouns is linked to elevated suicide rates" (Neff *et al.*, 2007, p. 7). They conclude: "[...] these results suggest that the psychological benefits of having a more interdependent self-concept are far-reaching" (p. 145). Thus, Goetz *et al.* (2010) highlight a need for more research on the "appraisals, experience, displays and physiology of compassion" (p. 364).

This supports educationalists, from Vygotsky to Cozolino (2013), who identify affect as a core mediator of learning processes. Indeed, "The minutest emotion affects learning" (Kingston, 2008). Fear and aggression are powerful mediators of the flight/freeze/fight paradigm of emotions that are motivated by the need to protect personal safety. Training students' attention-regulation skills, by focussing them on others' social experiences, learning and academic achievement in groups could also help their regulation of these negative emotions around personal safeness.

Safeness and cognitive load

In this regard, like P. Gilbert (2005, 2017a), Cozolino (2013) also emphasises: "The neural circuitry that assesses the environment for danger also serves as the infrastructure of attachment circuitry in social animals" so that safeness and learning "have evolved as interdependent processes" (p. 241). This is critical to this paper. He explains why, in biological terms (pp. 74-92), when people do not feel safe, cognitive processing cannot be made available for learning to take place: the brain is otherwise engaged in monitoring outside risks and potential dangers. Overall, it appears that safeguarding personal self-esteem could impede the development of Neff *et al.*'s (2007) notion of an interdependent self-concept and thus the cohesion of the discussion group as a single, thinking organism.

Self-compassion, compassion that is received from others or compassion that is given can stand down the brain's ever on duty threat system (Gilbert, P., 2017a) through the release of the neuropeptide oxytocin (Gilbert, P., 2016, 2017a Depue and Morrone-Strupinsky, 2005). This leads to a greater sense of safeness which in turn further down regulates the threat system:

When children and adults feel safe, they are more creative in their problem-solving, more integrative in their thinking (Gilbert, P., 2005, p. 22).

Helpful to understanding the cognitive processes involved in such thinking (which is free of distractions from attending to social or other anxiety) is a review by Zelazo *et al.* (2016) of current research on attention-regulation skills. From a number of studies, they identify these skills as being dependent on: cognitive capacity (the ability to think in flexible ways); working memory (the ability to recall information and apply it to the purposes of a current situation); and, impulsive inhibitory control (IIC) (the ability to resist enacting behaviours that are based on impulse or habit). These three capacities, which they refer to as executive functions, are important components of effective compassion in task focussed group work because all of them "are involved in conscious goal-directed problem solving" (Zelazo *et al.*, 2016, p. 2). We now discuss the first two executive functions together, and then the third. The functions are explored in relation to students' compassionate management of their group work.

Cognitive flexibility and working memory for empathy in compassionate groups

Empathy can arise from affective arousal which is the result of emotional contagion. This can be paralysing, if one is overwhelmed by the distress that one experiences as a result of seeing another in pain or trouble, one is impotent to act to help. Harvard biologist, Robert Sapolsky (2017) explains, "a fair degree of detachment is just what is needed to actually act. Better that, than our hearts racing in pained synchrony with the heart of

someone suffering, if that cardiovascular activation mostly primes us to flee when it all becomes just too much to bear” (p. 551).

This problematic emotional contagion type of empathy is activated by a particular neural circuitry (Gilbert, P., 2017a). But empathy, as a competency not an emotion, that uses Zelazo *et al.*'s (2016) cognitive flexibility and working memory, depends on a different neural circuitry. In group work, this second type of empathy is a cognitive ability to take others' perspectives, to think through the variables and potentials of their alternative histories and experiences, how their views have formed and/or the methods, interpretations of subject and the implications and potentials of these, that other people can bring to the table. This processing includes the need to tolerate one's own or another's distress in order to remain curious, to learn, to understand. Moreover, through curious enquiry, socratic questioning and open listening, the risk of projecting one's own feelings and understandings of the world on to others (instead of understanding the other person's) can be reduced. Projection refers to assuming that what you feel must be the same as what others are feeling. This is not empathy. It is rather like buying a gift for someone, say a picture framing kit, or a vintage toy car collection – on the basis that you would like to have such a gift.

As a competency, deliberative empathy (i.e. not projection, nor emotional contagion) helps in making sense of others (Weick *et al.*, 2005). Lilius *et al.* (2008) describe such empathy as an organising mechanism that tends to be recruited by compassion. Indeed, empathy is not only critical to noticing distress (the first psychology/component of compassion), and cognitively unpacking it to make sense of it, it is also critical to the second component of compassion: deciding what to do that will be the most helpful and wise (Gilbert, P., 2017a). This depends very much on a working memory that can be applied to a current situation. A simple example may be that it is not helpful to dive into water to save someone who is drowning and only then recall you cannot swim (Gilbert, P., 2017a). We now discuss the third of Zelazo *et al.*'s executive skills for attention regulation: IIC.

Blocks to IIC in the HE learning environment

Block 1: cognitive overload and heuristic thinking

Here, we discuss control of impulsivity which we take to mean: the tendency to take actions without sufficient information or deliberation to optimise the appropriacy, or likely outcomes, of such actions. Failures of empathy play a role here but there may be underlying reasons for that to do with environmentally mediated intentionality and motivation. We refer to a lack of inhibitory control amongst students in their evaluations of different others. It worsens extant communicative barriers between students of diversity who see others as different and therefore separate from themselves (Thornton *et al.*, 2012; Harrison and Peacock, 2010; Turner, 2009).

At the same time, some lack of inhibitory control of heuristic thinking is, perhaps ironically, licenced by attempts in HE teaching and learning to reduce it. For example, on some degree modules in UK, HE students are taught Hofstede's (1983) theories with the explicit purpose of promoting greater interculturalism and interconnectedness amongst students. Turner's (2009) account of such an endeavour on her business module in a Scottish university is an interesting example. She was disappointed in the outcome as the title of her article discussing it suggests: “Knowing Me, Knowing You, is there Nothing we can Do”?

Hofstede's thinking was influenced by Hall's (1959, 1969) theory of proxemics, according to which, people's cultures mediate the physical distances they maintain from one another in day-to-day life. Thus, for example, Hofstede concluded that the Japanese routinely observed such distance on the basis of people's agreed differences in power: power distance. He suggested this to be a key organising characteristic of the Japanese and attributed it to their “mental programming” (p. 76). Yet, it is Japan that is well-known for the practice by train station guards during urban rush hours, of leaning into commuters to push them closer together until they are crammed against each other.

Why is this acceptable in Hofstede's Japan? People's codes of behaviour change for many complex reasons, including for the pursuit of this or that resource. Identifying these codes (and their underlying motivations) that can switch behaviours seamlessly, including in groups, is important. It helps explain why accepted social norms in one context can suddenly be exchanged for seemingly conflicting alternatives in order to pursue other rewards (i.e. resources, such as salaries).

Pitner and Sakamoto (2005) suggest that practitioners such as tutors are dealing with increasing numbers of clients (students) and this is steering them into heuristic thinking – a falling back on (we suggest, Hofstedian) stereotypes – to process the identities of their students in the class room. This appears to be what happens amongst students too (Gilbert, T., 2012, 2016a, b). Students are socially navigating their places on often large cohorts whose memberships can be different from module to module. Nevertheless, this social-cognitive load is still not enough to explain the following. It is a field-noted observation of a small group of students in a control group related to the above research on compassion in group work.

Block 2: affiliative reward processing

In the first seminar of the module, an international student from central Europe was put into a discussion group of four. He found himself with three male British students and introduced himself to them at once. Even before he had finished, he had locked eye gaze with one student only who was sitting directly opposite him in the group. He maintained this sustained eye contact to the exclusion of the other two students in the group for the rest of the half-hour “group” discussion (Gilbert, P., 2017a). Social anxiety may have initially caused this student to direct his attention to one person only to talk to. However, he quickly took over the “discussion” and monopolised it.

The seminar, like the Japanese commuter train carriage above, is a small space for human interaction by strangers and in any such space, particular behavioural codes can arise and be adopted by the group, sometimes suddenly – for particular rewards. This may have underpinned the seemingly instant decision this student made about who he would direct his attention to, that is, to whom in the group he would affiliate himself, and to whom he would not. Studies of affiliative processes in the brain by neurobiologists are helpful for considering this second block to IIC in monopolisers in student group discussion work.

Depue and Morrone-Strupinsky (2005) investigated the “affiliative domain within the structure of personality[4]” and for this they used Tellegen's (1982) Multidimensional Personality Questionnaire which identifies two kinds of affiliative behaviour. One is social closeness and this demonstrates co-operation, capacity for warmth and altruism. The second affiliative behaviour is agentic extraversion which demonstrates capacity for boldness, assertiveness and leadership. Depue and Morrone-Strupinsky propose that agentic extraversion can resemble “competitive aggression” (p. 314) which, they note, influences not only the formation of social groups but their cohesion afterwards too. They identified three central neurobiological processes for each of these two types of affiliation: “appetitive and consummatory phases of reward processes and the formation of affiliative memories” (p. 1). In seminar groups, or indeed other student task focussed group work, these processes could be interpreted, according to Depue and Morrone-Strupinsky's model, as representing first, felt need or desire for certain affiliative bond(s) based on the prospect of reward; next, the process of initiating or being receptive to contact and the reward (or otherwise) that this results in; and third, the creation of memories of the events involved – memories that may be negative, positive or mixed.

It is the first two factors that are of interest in relation to the international student in the UK control group. They appear to have involved the student in rapid, largely unconscious, cost-benefit calculations about his personal affiliation options in the newly

formed group. The neural networks activated here were evolutionarily determined as part of deeper brain motivation systems from earlier times for survival (Gilbert, P., 2005). They are still very much on line as a constant in the human brain via the threat system which is also activated in these older parts of the brain. This is likely to be particularly so when students are (rightly, in our view) allocated into groups where they are not with the familiar friends whose subject-focussed thinking (as well as social responses) may be more predictable to the student.

A key purpose of CfP (including assessment of its group micro skills) is to reset the brain's processing of cost and benefits in relation to choices of affiliations., This is done through the deployment of reward incentives (degree credit) to initiate interpersonal affiliation processes with as many fellow students in seminars and other group work as possible.

Clearly, in our studies in the host university's three departments, above, some cognitive flexibility to reframe others in terms of cost-benefit calculations needed to be incentivised by reward (c.f. Depue and Morrone-Strupinsky, 2005). Such flexibility, nurtured by its reward incentive, might also help students strengthen inhibitory control of their otherwise, mainly unconscious, rapid and – in the prevailing private enterprise environment of HE (Chickering, 2010) – heuristic affiliative processing.

Motivating for student group “norms” of compassion

Paul Gilbert (2017a) emphasises that intentional, motivated attention is the first vital component of compassion. Indeed, compassion is “critical to the motivation to alleviate suffering in the immediate context” (Hansen and Trank, 2016, p. 356). It is not clear yet where HE stands in terms of these concepts in relation to its remit for the public good. But, it has been suggested that distress calls are likely to have originally evolved as signals of threat that warned others to run away and so escape the danger of the disease, predators or other danger that was causing the distress calls or signals (Sapolsky, 2017). Compassion evolved later. It brought with it the ability to approach, not run from, distress signals, and to help (Spikens, 2017) The problem is that to a degree, HE encourages students back to this very early evolutionary tendency to run from, or rather leave behind, the distress of others who may be struggling in a competitive environment (c.f. Kingston, 2008). A considerable amount of the qualitative data gathered from the control groups in the compassionate micro skills studies at the host UK university suggested this. For example, students often noted how, in non-CfP seminars, they or others got left behind:

S26: [...] it's just a case of everyone trying to scoop up as many grades as they can and normally people feel the only way to do that is by talking a lot and sort of hogging the spotlight[5].

Interestingly, the negative impact of this on the collective intelligence was also implicitly pointed to quite frequently, as here:

S11: [...] some people try to talk over you. So you try to say something, and they'll cut in, so like you're finally getting something out, and no one hears; they only hear the other people who talk all the time [...] They don't know the actual answer, they just talk and talk and talk[6].

In a similar vein, Duhigg (2016) reports that in the study of Google teams, above: “As long as everyone got a chance to talk, the team did well. But if only one person or a small group spoke all the time, the collective intelligence declined”.

In contrast, where students were offered support in use of the compassionate micro skills of group work (three examples of which skills are shown in Table A1; see also Gilbert, 2016a, b; 2017a, b), there was evidence of the cognitive flexibility needed to focus on subject and on, sustained close observation of the self and others in the group's internal interactions. For this black male student who scored over 70 per cent in his assessed seminar, including

specifically for his subject-relevant critical thinking performance, these micro skills were key because:

S33: Those things help you to focus [...] I know I was. I was like watching each other. What's the body language like? How much is [sic] so many people talking[9]

These are skills that train students to observe carefully, like micro-ethnographers, what is affecting the group and how:

S24: We were sort of analysing [...] I know I was. I was like watching each other. What's the body language like? How much is [sic] so many people talking[9]

This attention regulation, also apparently helped to regulate negative emotions. Here, S1 who described herself as an over talker, talked about a change in her feelings of annoyance with fellow monopolisers after use of the micro skills: "I used to grit my teeth"[10]:

S1: But now [...] I mostly deal with it by waiting for them to finish their point – "cause I don't want to cut anyone up[11]".

This and comments like it suggest increased IIC (c.f. Zelazo *et al.*, 2016). Moreover, she had noticed changes in her fellow monopolisers' behaviours too: "I notice that they've got a reduction in how they're being as well"[12]. She explained further:

S1: I have noticed that some people are a lot more, um, reflective now to what's being said, so their contributions are more – because they're listening to other people – their contributions are a lot more in depth because it's not just surface anymore[13].

The CfP's focus on, regulation of attention appeared to help monopolisers to speak less and yet contribute more (i.e. of substance). This may have contributed to the statistical results for academic performance related to the CfP research at the host university. It also appears to align with what Google found was raising collective intelligence in their best-performing teams (Duhigg, 2016).

Rewards, oxytocin and changes to neurobiological affiliation processing

Recalling Neff *et al.*'s (2007) findings on the "far-reaching" benefits of "having a more interdependent self-concept"(p. 145), is this student-reported experience of a CfP assessed seminar:

S29: I felt not as one person but I felt as a person within an entity and the entity was my group [...] I felt that I was part of the group and I didn't feel like an individual at that point. It didn't make me feel like I'm focused on it. It made me feel like we're all focused on it[14].

Similarly, this ethnic minority female student (S24), talked about two friends (one a white local male (S26), the other Malaysian female (S25)). These three business students were planning to open a business together after university, but:

S24: I mean S26 has been doing my course for a whole year. I'd never noticed him [or] even S25 [...] I'd just sit there [...] I would miss some of my tutorials [seminars] because I didn't wanna be there [...] I didn't know anyone there and I felt like no one would speak to me [...] in the [CfP] tutorials that we had, it was a whole class: everyone knew each other, everyone was communicating[15].

Note her reference to time in relation to being alone. These BME students, next, talked about their final filmed examined discussion, where: their individual use of compassionate micro skills; and their critical thinking and research skills, were separately assessed. This loss of a sense of self can induce a sense of time quickening when reward centres are activated:

S31: I think it [the examination group discussion] was getting interesting. Time was going a bit too fast.

S32: Cause we was actually forced to stop by one of the lecturers[16].

S33: I actually think we kind of got too excited with the discussion?

“Cause we actually really got into it, really, really got into it[17].”

Similarly, in a different CfP focus group:

S23 You know, if we choose an interesting subject to talk about we could go on and on, we could push it [the one hour seminar] to two, three hours. Cause that’s how I felt sometimes, “cause I really wanted to[18].”

Decety *et al.* (2012) have conducted neuroimaging research that shows compassionate action to involve activation of reward centres in the brain. This aligns with Depue and Morrone-Strupinsky’s findings on the release of oxytocin in association with the neurobiology of satisfying outcomes of affiliation processes. Similarly, Jensen *et al.* (2013) found in their study that when physicians believed that they were being effective in reducing a patient’s pain, reward-processing areas involving dopamine were activated in the ventral striatum. This, and the role of oxytocin, suggests why CfP students talked in the ways that they did, about (apparent progressions towards) helping behaviours in their CfP groups, compared to controls (above). Here for example, in Literature, this post graduate said:

S13: At undergraduate level, um, I often used to get quite annoyed [...] when we got people who were so shy that they wouldn’t talk, you’d sort of think, “Well, I want to get something out of this, so I *will* talk.” And [...] you realise, “Well no, we’re also responsible for making sure other people *have* things to say and *want* to talk”[19].

The empathy to notice and take the perspective of the other person, mentalising his or her needs (the first component of compassion) can then be followed by informed compassionate action, as happened here for shy undergraduate business student (Y) in his (assessed) research-based discussion group:

S30: I don’t know if you guys noticed but (Y), he found it harder to communicate, but I think when we pushed him throughout the oral presentation [...] he just became, he just delivered it all out [...] you need someone to kick start you [...] who might turn out to be a friend later on [...] it comes out [...] It comes back [...] ideas start flowing [...] [20].

And in English Literature:

S4: All we had to really think about was that we were helping each other [...] if I screwed up completely [someone else] would save me and be like “Oh, well what about this?” [...] we stalled [...] we stalled. We knew we’d help each other[21].

Overall, this syncing of group members to come to the assistance of a single member may be related to the role that oxytocin again plays as part of the reward system of helping others (Jensen *et al.*, 2013). This can work in subtle communicative ways:

S4 [...] [we] just sort of look at each other and sort of acknowledge whether or not someone else has got something to say. I think it’s just sort of like a mutual acknowledgment – weird isn’t it[22]?

Further explaining these kinds of syncing are Shahrestani *et al.*’s (2013) findings that the oxytocinergic system enhances the ability to identify social signals, such as those in other people’s facial expressions. Colonello *et al.* (2017, p. 111) posit that this is because “the early detection of positive emotions [in others] [...] is important to bond formation” and also to “positively reinforce and maintain compassion-focussed behaviour”.

As well as the involvement of oxytocin, this syncing in groups (as experienced above by students such as S29) is also supported by with mirror neurons that di Pellegrino *et al.* (1992)

first identified amongst macaque monkeys who showed activation of neurons in the F5 (for monkeys) of their premotor cortexes when observing others performing actions. This kind of mirroring of others can also be part of a validating (Leahy, 2005) mechanism, as well as being a helpful empathic tool. Students recruited this to make their transitions from (simply) multicultural to interculturalised group interactions:

S18: [...] to make friends and [...] walk in their skins like, try to see what kind of personality they [are] [...] adapt to them so you can communicate with them[23].

Claims like this were tested by, for example, the arrival of this Muslim female student, below, three weeks late on to a CfP business module. She said:

S28: When I go into seminars I find any other Muslim people there [...]. Most of the others, I'm probably not gonna talk to them to be honest [24].

So I was thinking, "Oh my God. What if no-one talks to me?" But as soon as I got into a group I was fine, I was fine. [...] I did the research so I was really lucky [sic]. We just got into the discussion and took it from there. It flowed really well [25].

Compassionate training and the neural circuitry

Outside of HE (as yet), because of the brain's neuroplasticity, it is possible to image the effects of compassionate mind training on the development and enhancement of particular neural circuitry in the brain. Moreover, these changes, as shown by fMRI, may overlap with the neural circuitry of brain processes associated with empathy, but they are also separate and distinct as suggested earlier. Klimecki *et al.* (2014, p. 1) found increased activity in brain regions associated with empathy for pain when subjects were exposed to empathy training and then shown videos of human suffering. The anterior insula and anterior midcingulate cortex were involved and there was increased negative affect. This could be associated with our earlier discussion of emotion contagion. But, the researchers say, "In contrast, subsequent compassion training could reverse the increase in negative effect". Compassion training also "increased activations in a non-overlapping brain network spanning ventral striatum, pregenual anterior cingulate cortex and medial orbitofrontal cortex. We conclude that training compassion may reflect a new coping strategy to overcome empathic distress and strengthen resilience" (Klimecki *et al.*, 2014, p. 1).

But without the benefits of fMRI at the disposal of teaching and learning development in HE, it has been important for students to help us evaluate their experiences of possible longer term changes to their behaviours beyond their brief encounters with the compassionate micro skills for group work. We found many had remained alert to opportunities to enhance team experiences in the work place, on other modules, in group job interviews. For example:

S24: I do see a change when we have meetings on some of my modules. If there is something in front of us, if I just quietly move it to the side [...] a laptop or a stack of books [...] I did notice there was a change in the way the person opposite me was talking to me[26].

Such indication of longer term effects of the CfP are supported by Weng *et al.* (2013). They have identified that even short-term training in compassion causes changes to activation in the inferior parietal cortex, the dorsolateral prefrontal cortex (DLPFC), and in DLPFC connectivity with the nucleus accumbens. These are areas associated with social cognition and with emotion regulation.

Thus, this raises the question of the degree of students' receptivity to the notion of such training in HE. Students appeared to be already primed for exposure to the CfP. They seemed already motivated to attend to the problems that caused themselves and/or others to be distressed or disadvantaged by group work interactions. Once aware of how easy this

pedagogy was, to learn and to use, reflections like these below, turned to institutional responsibilities, and this was something of a surprise:

S10: You use your seminar skills, your discursive skills all the time through undergrad and they really never get analysed in any way – you don't get marked for them and I think it's probably a failing of University[27].

S14: Half – *half* – your time in university is spent in the seminar. And you don't get assessed for that[28].

And elsewhere:

S4: If everyone had [had] the advice and assessments – yeah, assessments on how to get involved and talk their minds, I think we would have benefitted. Looking back on my undergrad, I would have really appreciated people being able to speak up and have discussion [...]29].

Conclusion

This paper has explored the notion of attention regulating skills that are supported by the executive skills of cognitive flexibility, working memory and impulse inhibitory control (Zelazo *et al.*, 2016). It has then considered the place of empathy as a valuable cognitive competency in the execution of both psychologies of compassion – to notice distress or disadvantaging of the self and/or others and to act to reduce it. We propose that Zelazo *et al.*'s executive skills for attention regulation – cognitive flexibility, working memory and impulse inhibitory control – can all be developed by CfP. The allocation of degree credit for filmed (demonstrable/observable) compassion, on the hoof, is one motivation for students to participate. But the strategic, mechanical enactment of compassion was not identified in the available data sets here, nor detected in the interview narratives.

One reason for this may be that this motivation to care (Gilbert, P., 2017a; Sapolsky, 2017) is evolutionarily determined. Human archaeologists like Penny Spikens (2017) are keen to point out, overwhelming evidence has been found in early human remains from hundreds of thousands of years ago, of the globally widespread practice of tender care for the sick, the injured or disabled for often years at a time and through hard times of few resources. Through the development of new technologies in her field, such evidence confirms our brains are evolutionarily primed with the motivation to care for each other and that this is a very old behavioural “norm” – one that makes evolutionary sense for many reasons. Thus, we have not arisen out of a relentless and unmitigated history of violence that has been constructed for us and which therefore, as Spikens points out, can perpetuate itself because of our mistaken conceptions of who we really are. Education, from school to university has a major role to play in reclaiming who we are as a species and what our species can become.

An outline of Google's Project Aristotle opened this paper. It was Aristotle who proposed that virtues such as compassion could become part of a person's natural behaviour through practice. Group work is an ideal crucible in which, cost-free, HE can easily develop creative, critical and compassionate graduates who are motivated and equipped to build co-operative, interdependent communities locally and globally. Sapolsky (2017) explains: “The key is neither a good (limbic) heart nor a frontal cortex that can reason you to the point of action. Instead, it's the case of things that have long since become implicit and automatic – being potty trained; riding a bike; telling the truth; helping someone in need”(p. 552).

There have been nine years of research to date at the University of Hertfordshire on how to get compassionate micro skills taught, practised and assessed on the modern degree curriculum. A key purpose has been to free students to think rationally and integratively, rather than be pre-occupied with their own (perhaps not so much others) social and academic safeness. In this sense, HE might usefully share Google's curiosity about the psychosocial dynamics of extraordinary teams that have found “how to create psychological safety faster,

better and in more productive ways” to augment their collective intelligence (Duhigg, 2016). Feelings of reasonable safeness in the academic and social milieu of the university campus, nurtured by a sense of warm interconnectedness with others, is now irrefutably relevant to the UK’s currently highest ever levels of anxiety and depression amongst HE students (YouGovUK, 2016). The UK is also facing its highest ever recorded number of student suicides (Office of National Statistics, 2017), most often by hanging. It is unfortunate that the sector has now been left, so far, behind by its sister disciplines in the area of compassion. Indeed, in the corporate world too, while HE dribbles its toes in the sand, Google is joined by IBM, PcW and many other companies investing in ways to accelerate the nurturing of effective in-house team dynamics that attend to safeness in psychosocial processes. But neuroscience is joining with other disciplines to armour teaching staff to assert their own rational action in the HE class room over the concept of compassion, should they so wish, for themselves, their colleagues, their students, their teams.

Notes

1. This training in compassionate micro skills for student group work is now also part of the induction of all new teaching staff to the university (continuing academic and professional development programme).
2. The gap between white local students and black and minority ethnic students in terms of degree attainment (the attainment gap) is currently circa 18 per cent in the host UK university and across the UK Higher Education (HE) sector as a whole. Extensive research on possible causative factors for this gap has been carried out by a number of studies which support the findings of Broeke and Nicholls (2007) that a deficit model fails to explain the gap. From its own findings too amongst 938 BME students, the UK’s National Union of Students (2010) called for anonymous marking across the sector, and more socially integrative pedagogy and an increased level of class room discussion work in which to apply it.
3. The drive system is associated with the big hit, the high score, the big win – temporary euphoria (the release of the neurotransmitter dopamine). It can be associated also with the transitory and externally determined experience of happiness. Happiness, here, is in contrast to sustainable contentment. The latter is cultivated by deliberative, conscious, reasoning processes that manage the self-soothing system. The effectiveness of such soothing self-talk is optimised by a warm and kind tone (Gilbert, P., 2005, 2017a).
4. They define affiliation as “enjoying and valuing close interpersonal bonds and being warm and affectionate” and emphasise that “affiliation is clearly interpersonal in nature” (p. 2).
5. S26, local white male, stage 3, focus group transcript, p. 3, lines 77-78.
6. S3, UG female, stage 2, one-to-one interview transcript, p. 9, lines 252-255.
7. S33, local black male, stage 3, post-assessment focus group 3 transcript, p. 4, lines 101. Also note: oddly, this was S33’s first in any module through his first and second year, so far, in HE.
8. S33, local black male, stage 3, post-assessment focus group 3 transcript, p. 4, lines 106-107.
9. S24, local ethnic minority female, stage 3, post-assessment focus group 2 transcript, p. 4, lines 96-97.
10. S1, stage 1, one-to-one interview transcript, p. 3, lines 67.
11. S1, stage 1, one-to-one interview transcript, p. 3, lines 67-68.
12. S1, stage 1, one-to-one interview transcript, p. 3, lines 64-65.
13. S1, 3rd year female, stage 1, one-to-one interview, p. 1, lines 28-29.
14. S29, local ethnic minority male, stage 3, post-assessment focus group 3 transcript, p. 15, Lines 491-494.

15. S24, local ethnic minority female, stage 3, post-assessment focus group transcript, p. 8, lines 243-251.
16. S31, S32, local ethnic minority males, stage 3 post-assessment focus group transcript, p. 3, lines 184-186.
17. S33, local black male, stage 3, post-assessment focus group 3 transcript, p. 2, lines 53-54.
18. S23, local ethnic minority male, stage 3 mid-module focus group, p. 1, lines 10-25.
19. S13, PG female, second year/run of stage 3, focus group transcript, p. 9, lines 294-297 (Italics in the data have been used to signify emphasis/word stress on the word made by the interviewee).
20. S30, local ethnic minority male, stage 3, pos-assessment focus group 3 transcript, p. 11, lines 354-357.
21. S4, PG female, stage 3, joint interview transcript, research methods module, Literature, p. 6, lines 154-156.
22. S4, female, stage 3, joint interview transcript, p. 4, lines 114-116.
23. S18 International/Thai male, stage 2, focus group transcript, p. 2, lines 112-114.
24. S28, local ethnic minority female, stage 3, mid-module focus group transcript, p. 5, lines 133-135.
25. S28, local ethnic minority female, stage 3, mid-module focus group transcript, p. 5, lines 110-115.
26. S24, local ethnic minority female, stage 3, post-assessment focus group 2, p. 5, lines 140-153.
27. S10, PG male, stage 3 focus group, p. 1, lines 22-25.
28. S14, PG male, stage 1, focus group transcript, p. 2, line 40 (Italics in the data have been used to signify emphasis/word stress on the word made by the interviewee).
29. S4, PG female, stage 3, joint interview transcript, p. 5, lines 121-125.

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Signs of group communication dysfunction to notice	Objective	Compassionate micro skills
<p><i>Monopolisers</i> These over-talkers tend to fix eye contact with one person only in the group, often the person directly in front of them (Gilbert, 2016a, b, 2017a, b). Anxiety may be one reason (Yalom and Leszcz, 2005). The person to whom the monopoliser is directing all his/her attention/eye contact is now a colluder in an <i>α</i>pair (Bion, 1961); and he/she should notice this. <i>The colluder</i> does not act/or acts and the monopoliser does not respond</p>	<p>To signal to the monopoliser that the group (including the monopoliser) needs other perspectives/input to optimise the quality of group problem solving, analysis and/or criticality on task</p> <p>Other group members share responsibility to signal to the monopoliser that others also need eye contact so that a more equal spread of participation can be facilitated</p>	<p>The colluder breaks eye contact with the monopoliser, directing/ channelling the over-talker's gaze to left and right – that is, to all other members in the group, as though the group is a single organism</p> <p>Other group members act non-verbally to break up the dyad. Non-verbal communications field-observed to be effective (Gilbert, 2012, 2016a, b, 2017a, b) include: slight hand waves, tipping sideways of the head towards the colluder, hand extended across the table, reaching and pulling gestures and so on, as group members see fit, until the over talker's eye contact becomes inclusive to facilitate participation, (not simply interruption) by others. Group members invite, by name, the quiet student from time to time, e.g., "What do you think, Sam?" also allowing Sam to say, (something like): "Nothing just now" so that the group moves on seamlessly, until Sam is invited again later, e.g., "Sam, do you think that [...] "That is, entry points into the discussion are kept available to all members</p>
<p><i>Quiet students</i> Some students do not speak/ contribute much to the discussion</p>	<p>For the group to notice, not normalise this; and to create conditions in which the "quiet" student has "something to say and wants to say it" (S4)</p>	<p>Group members invite, by name, the quiet student from time to time, e.g., "What do you think, Sam?" also allowing Sam to say, (something like): "Nothing just now" so that the group moves on seamlessly, until Sam is invited again later, e.g., "Sam, do you think that [...] "That is, entry points into the discussion are kept available to all members</p>
<p>Note: Students are supported in their ability to notice dysfunctional dynamics – what to watch out for</p>		

Table A1.
Three examples of compassionate micro skills for effective group work

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