

# SELECTION & DEVELOPMENT OF SHORT-TERM PROJECT TEAM MEMBERS: DEVELOPMENTAL STABILITY AS AN INDICATOR OF INTERPERSONAL SKILLS

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## ABSTRACT

Short-term project teams do not have the advantage of prior performance or long-term membership to facilitate development of effective team performance. Research suggests interpersonal skills are crucial to success but this is under researched longitudinally. Evolutionary psychology can provide a lens to explain how people develop differing levels of interpersonal skills via the relationship between fluctuating asymmetry and pro-social behaviours. This research aims to investigate the relationship between fluctuating asymmetry and interpersonal skills, the impact of training and to further the evolutionary psychology field by embedding research in a real-world context as opposed to solely in laboratory or student settings.

**KEYWORDS:** Evolutionary Psychology, Project Teams, Longitudinal

## 1 INTRODUCTION

Evolutionary psychology is increasingly being used as a lens through which to understand the socio-biological factors that affect why people behave the way they do in organisational settings (e.g. Senior et al. 2012; Van Vugt, Hogan & Kaiser, 2008). The paradigm suggests that some adaptive behaviours; developed during our evolutionary history; may not be suitable in our current modern society and that by understanding what mechanisms drive these behaviours, we have the opportunity to change our behaviour through reflexive learning and training (Nicholson, 2005a). One mechanism which can be used in this type of research is Developmental stability; the degree to which an organism can withstand genetic and environmental stresses, has been linked through fluctuating asymmetry (FA) to differing levels of pro-social behaviour development with greater asymmetry associated with pro-social behaviours and greater symmetry with anti-social behaviours (e.g. Fink et al. 2005). Senior et al. (2012) for example identified a relationship between FA and transformational leadership which is a pro-social form of leadership. Most prior research in this area has been done in laboratory settings or with student groups (e.g. Fink et al. 2005; Senior et al. 2007) and this research aims to further the field of applied evolutionary psychology by embedding research in a real world context. The evolutionary psychology approach allows for the examination of individual level team effectiveness factors from a more fine grained perspective and also paints an ecologically valid approach to this research which is often paid lip service to in other work. The research will also have a theoretical contribution by adding to knowledge in how individuals contribute to leverage performance in multidisciplinary project teams which is currently not well understood (Bstieler & Hemmert, 2010).

This research stems from a ESRC CASE studentship with British Sugar who wants to improve its ability to create and manage project teams that can deliver capability-raising changes in line with business objectives Although working in short-term cross-functional project teams is becoming

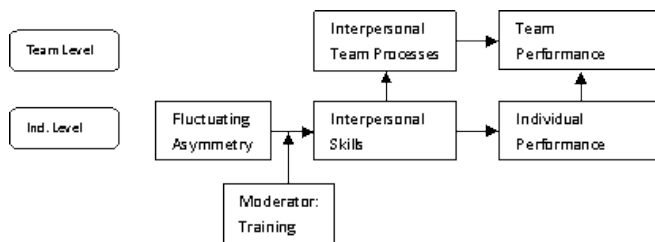
increasingly common in organisations, there is an imbalance between the popularity of utilising teams in organizations and the evidence of their effectiveness as well as a lack of longitudinal team research (Mathieu et al. 2008). These types of teams often have dynamic compositions and do not have the advantage of prior performance or long term team membership to allow members to develop trust and cohesiveness, emergent states which are linked to effective team performance (Sundstom et al. 2000). Pro-social behaviours and specifically interpersonal skills have been identified as a key component of effective team work (Mathieu et al. 2008). Communication, conflict management and problem solving skills are interpersonal skills (pro-social) that help build trust and facilitate a good working relationship and are key individual level inputs for effective team work (Thamhain, 2004) This research suggests that team members who are skilled in interpersonal teamwork skills will be more effective in short-term project teams and will use an evolutionary psychology perspective to show that there is link between developmental stability; as indicated by FA and higher levels of interpersonal skills which will have implications for team formation and training. By understanding why some individuals demonstrate better interpersonal skills than others, managers can select project team members who display high levels of interpersonal teamwork skills and also train people in these skills to increase future capacity.

### 1.1 Research Objectives and Contribution

- To investigate whether the fluctuating asymmetry of team members is an indicator of their interpersonal skill level and whether this is moderated by prior training or teamwork experience.
- To further the field of applied evolutionary psychology by embedding research in a real work context as opposed to solely in laboratory or student settings.
- To contribute to academic knowledge by conducting real-world longitudinal research of short-term cross-functional project teams which is an under researched area

## 2 LITERATURE REVIEW

The following literature review will start with the conceptual model (Figure 1) followed by discussion of the use of evolutionary psychology as a lens through which to examine behaviour within organizational contexts. Next, the relationship between developmental stability (fluctuating asymmetry) and pro-social behaviours will be reviewed. Finally, importance of interpersonal skills as key to effective team performance will be discussed as the specific context of the research.



*Figure 1: Theoretical Model relating FA to Interpersonal Skills and Project Team Performance.*

### 2.1 Evolutionary Psychology

Evolutionary psychology focuses on how socio-biological factors affect human behaviour. Initially this field focussed mostly on the study of behaviours relating to evolutionary survival challenges such as mate choice and sexual attraction, cognition and emotion, cooperation and conflict (e.g. Cartwright, 2008) but over the past 15 years; due to advances in cognitive neuroscience techniques; it has begun to be recognised as a theoretical paradigm that is relevant to the study of human behaviour in organisational contexts as it offers a lens through which to understand why people behave the way they do in organisational settings (see Becker, Cropanzano & Sanftly, 2011; Lee, Senior & Butler, 2012; Senior, Lee & Butler, 2011 for reviews), particularly where the behaviours are not beneficial to

the organisation or to themselves. Examples of the application of evolutionary psychology to the study of organizational behaviour include leadership (e.g. Nicholson, 2005a; Senior et al. 2012; Van Vugt, Hogen & Kaiser, 2008) and free riding or social loafing (e.g. Tooby, Cosmides & Price, 2006). Van Vugt et al. (2008) suggest that research utilising an evolutionary psychology approach has the potential to encourage organizational practices to be designed to work in harmony with our evolutionary driven behaviours and that this may potentially increase organisational effectiveness.

Evolutionary psychology starts from the premise that today's human behaviour as we see it today is a stems from contemporary environmental influences acting upon ancestrally designed mental hardware (Cartwright, 2008) and that the behaviour that results may not always be 'adaptive' within contemporary contexts as the time since the appearance of modern human agricultural civilisation represents only about 5% of the time since the appearance of homo sapiens and about 0.5% of the time since the appearance of the homo genus and over this last 5% (10,000 years) the environment that we live in has radically transformed (Buss, 1999). Human behaviour is driven by evolved adaptations, inherited characteristics which once promoted reproductive successes by solving survival problems of the time period better than any alternatives (Tooby & Cosmides, 2005; Williams, 1992). Our current adaptive mechanisms are not optimally designed, this is firstly due to the evolutionary time lags of thousands of generations of ongoing selection pressure as mentioned above, for example, in the hunter gather world when food was scarce, fat conferred an advantage leading to an adaptation desiring fat in our diets which today leads to clogged arteries and heart attacks (Buss, 1999). Secondly there is a cost of adaptation that prevents optimal design; in essence adaptations are only adopted if the benefits outweigh the costs (Williams, 1992).

The field of evolutionary psychology is not without controversy and its opponents argue that it places too much emphasis on the genetic origins of behaviour and understates the impact of environmental influences, learning and language in shaping behaviour; the nature-nurture debate (Cropanzano & Becker, in press; Lindebaum, in press; Nicholson, 2005b). Evolutionary psychology however does not suggest that human behaviour is hard-wired and rejects this genetic determinist view, instead it utilises an interactionist framework which suggests that adaptive behaviours occur when triggered by environmental inputs but that humans also have the ability to be reflexive and genetically based behavioural mechanisms can be affected by development and modified by learning i.e. our nature can be affected by nurture and our nature may influence how we react to nurture experiences (Buss, 1995). Thus, evolutionary psychology does not suggest that people are all alike or purely a product of our genes. Instead it is recognised that individual differences are caused by the interaction of genes and personal experiences across the life span (Nicholson, 1998). Knowledge about our evolved psychological adaptations and the environmental inputs that they were originally designed to be responsive to means that we have the possibility of choosing to change our behaviour if a change is desired e.g. in response to social or technical changes (Buss, 1999).

### **2.1.1 Developmental Stability and Fluctuating Asymmetry**

Assessment of developmental stability via fluctuating asymmetry has become of interest to organizational psychologists due to new studies that show that variation in symmetry (facial/body) can be used to predict a number of psychological and behavioural traits including intelligence, personality and pro / anti-social behaviours, all traits which have been shown to be relevant in the field of organizational psychology e.g. leadership and job performance (Senior et al. 2012). FA; the degree to which there is left-right body symmetry in humans and other organisms; is an indicator of developmental stability which is the degree to which an organism can resist environmental or genetic stressors (Clarke 1988). These stressors can range from issues with maternal health during pregnancy to difficult living conditions and result in small deviations in symmetrical form during development. Greater symmetry (fewer deviations) corresponds to greater developmental stability which in turns corresponds to greater genetic fitness (Thornhill & Gangestad, 2006; Van Valen, 1962). Developmental stability is measured through calculating FA which is the left-right asymmetry of a set of typically left-right symmetrical body traits (Bates 2007) typically finger length, wrist width and ear length but can also include the face. FA has been used as a reliable and indeed optimal indirect measure for heritable genetic fitness which has been previously shown to correlate

(negatively or positively) with a number of variables e.g. health, attractiveness and mating success (Bates, 2007; Gangestad & Thornhill, 1997).

In terms of psychological variables, the most consistent findings have been found between FA (body and facial) and pro or anti-social behaviours with greater symmetry being correlated to socially adverse behaviours: aggression, disorderliness, risk-taking and anxiety/neuroticism and greater asymmetry to pro-social behaviours e.g. empathy, patience, impulse-control and agreeableness, (Grammer & Thornhill, 1994; Holtzman, Augustine & Senne, 2011; Lalumiere, Harris & Rice, 2001, Simpson et al. 1999). There is a relationship between FA and cooperation (Zataari & Trivers, 2007) and transformational leadership (Senior et al. 2012), which have both been previously linked to effective team performance (Morgeson, Reider & Campion, 2005; Stewart, Fulmer & Barrick, 2005). Zataari & Triver's (2007) compared FA (body) and cooperation behaviour in terms of monetary offers in the ultimatum game and found that symmetrical men were less cooperative and made lower offers. A corresponding study by Zatarri, Palestis & Trivers (2009) found that those making the decision on the monetary split in the ultimatum game gave more to symmetrical respondents and this was further supported by the cited motivation of attractiveness. Senior et al's. (2012) study demonstrated that greater asymmetry of team leaders was related to transformational leadership behaviours, leader satisfaction and team outcome measures with a longitudinal study of student teams on a business game module.

Other studies have shown have shown that greater symmetry is associated with perceptions of attractiveness (Grammer & Thornhill, 1994) and physically attractive people are imbued with these positive social traits (sociable, lively, self-confident, balanced) by others (Fink et al. 2006). This finding is interesting as it suggests that people use facial symmetry as a perceptual clue to other characteristics but that our perceptions while correct in relation to health may be in conflict with reality when considering psychological traits and behaviours as discussed above (e.g. Holtzman et al. 2011). Little and Jones (2006) suggest that the perception of pro-social traits via developmental cues such as FA which was beneficial to survival in our developmental history and was thus adopted by natural selection.

Holtzman et al (2011) suggests two possible (but not mutually exclusive) explanations. The first is reactive heritability: that the development of socially adverse traits are influenced by physical features, the second is shared heritability: that socially adverse traits may have conferred a fitness advantage at some point in human evolution alongside developmental stability (FA) so that they have a shared heritability. The reactive heritability explanation is based upon the fact that people have the capacity to reflect on who they are and this 'self' includes one's physical features and from this they can make inferences about their relative social standing. If symmetry influences popularity (e.g. due to potential value as a mate) then this could allow more leeway for socially adverse behaviours, whereas for asymmetric individuals, socially adverse traits would present an additional cost in pursuit of friends and partners. Thus asymmetric people may develop more pro-social traits to offset any incurred social costs due to asymmetry (Lukaszewski & Roney, 2011; Holtzman et al. 2011). The shared heritability explanation is based on the idea that socially adverse traits conferred fitness in terms of mate selection as people who are more symmetrical tend to have more mates (Thornhill & Gangestad, 1994) and people who are socially adverse prefer to engage in more short-term mating (Jonason et al. 2008). Based upon the reactive heritability explanation these findings do not suggest a nature over nurture argument but an interaction argument in that we are heavily influenced by our social experiences because of our biology i.e. because of individual biological differences, humans are differently influenced by social experiences and other environmental inputs such as our responses to the perceptions of others, as humans live and work in social groups (Becker, Cropanzano & Sanfey, 2011).

### **2.1.2 Fluctuating Asymmetry and Interpersonal Skills in Project Teams**

Senior et al's. (2012) findings related greater FA to greater transformational leadership and team performance and discussed that as humans evolved and early social groups grew in size, competent leaders who were able coordinate groups would require more abilities than just social dominance to be successful and therefore leaders would emerge or be chosen due to the possession of pro-social traits such as integrity and trust and behaviours such as communication and cooperation and these in turn

would be adopted by evolutionary selection processes as is now seen in the traits of effective contemporary organizational leaders (King, Johnson & Van Vugt, 2009; Nicolson, 2005b; Van Vugt et al. 2008; Van Vugt & De Cremer, 1999). Although, alpha male dominance hierarchies may be normal in non-human primate groups and may be suitable for certain organisational contexts such as the military, dominant alpha male leaders are not normally effective in other organisational contexts (Johnson & Earle, 2000).

The pro-social behaviours that are key for effective leadership are also relevant to effective team performance in relation to interpersonal teamwork skills especially with the increase in team work in organisations and in particular of cross-functional project teams (Denison, Hart & Kahn, 1996). Webber (2002) suggests that short-term project teams provide a number of unique challenges to their effectiveness due to a number of factors: functional diversity can affect trust and cohesion due to differing skill sets, terminology differences and differing styles of working. Their cross-functional composition can lead to competing social identities or loyalties between team and functional group and if not assigned to the team 100% of time leading conflict between team and functional priorities (Holland, Gaston & Gomes, 2000). Project teams are time limited which can lead to a focus on task-orientated team behaviours as project management theory still views projects as technical systems as opposed to behavioural systems neglecting the relationship aspects which are essential to effective performance, although, these are becoming increasingly recognised (Chiocchio & Essiembre, 2009). Team members may not have worked together before, have a short time to form and develop and due to the limitations, are often dealing with tasks under high pressure and conflict which can hinder the development of trust and cohesion (Denison et al. 1996). Finally project teams may have varying team membership across the project life-cycle which can further hinder the development or stability of trust and cohesion (Sundstrom et al. 2000). Senior et al. (2012) highlight the importance of understanding the mechanisms that may contribute to effective leadership and in the same vein, it is important to understand the mechanisms that may contribute to individuals being effective project team members and to that end the evolutionary psychology paradigm can be used to gain a more fine grained understanding about mechanisms that may drive the development of differential abilities in interpersonal skills as this has implications for selection and training of individuals into leadership and team roles in organisations.

Team research has stressed the importance of interpersonal skills for effective team members (Mathieu et al. 2008). Interpersonal processes such as conflict management, communication and cooperative problem solving, have been shown to positively predict performance in project teams (Druskat & Kayes, 2000; McClough & Rogelberg, 2003). However interpersonal competencies are not universal in the organizational setting (Argyris, 1991; Edmondson & Smith, 2006; Garvin & Roberto, 2001). The failure to manage team member conflicts, in particular interpersonal conflict, is known to be detrimental to performance (e.g. Jehn, 1995). Bradley, White, & Mennecke (2003) concluded that: beyond a couple of hours or a few days then poor interpersonal relationships are detrimental to cohesive team performance. Stewart, Fulmer & Barrick (2005) posited that social skills are one of the keys to team cohesion and effective team performance. Marks, Mathieu & Zaccaro, (2011) posit three types of team processes: transition, action and affective and this research suggests that good individual level interpersonal skills will lead to good team level affective process (e.g. cohesion and trust). Cannon-Bowers et al. (1995) noted that interpersonal skills need to be above a minimum level before teams perform effectively. Mcgrath & Kravitz (1982) suggest that in disjunctive tasks, team performance is as good as the most capable member and in conjunctive tasks, no better than the least capable member and determined by the average member in additive tasks. In project teams there may not be a clear leader, instead there may more of a shared leadership role with a project manager and group decision making. In this case it would be especially beneficial for members of this type of team to have high levels of interpersonal skills and this research suggests that these types of individuals would make better project team members over and above competence in task skills.

High FA is linked to pro-social behaviours and to team performance via transformational leadership (Senior et al. 2012). However the relationship between FA and interpersonal teamwork skills which are all pro-social (cooperation, conflict management, communication) is not known. FA may help explain why some people have developed better interpersonal skills than others. This is not to say that if this is true then it should be used as a sole selection criteria as it has been shown that

teamwork relationship behaviours can be learnt (Edmundson & Nembhard, 2009; Edmundson & Smith, 2006) and if so then although some individuals may be naturally better at interpersonal behaviours due to the reactive heritability hypothesis, this hypothesis also supports the idea that skills can be learnt and this may help moderate any difference caused by higher FA during development.

- *Hypothesis 1*: Greater FA of an individual is associated with greater interpersonal teamwork skills
- *Hypothesis 2*: Prior teamwork training or teamwork experience will moderate the relationship between an individual's FA and their interpersonal teamwork skill scores
- *Hypothesis 3*: Teams with higher interpersonal skills ratings for their members will perform better and have higher levels objective individual / team performance indicators.

### 3 METHODOLOGY

This research plans to conduct three studies to investigate the relationship between FA and interpersonal skills. Initially a pilot correlation study is currently being conducted to assess the hypothesised relationship between fluctuating asymmetry and interpersonal skills. Following this two studies will run in parallel. The first will be with British Sugar project teams, the partner organisation for this ESRC CASE PhD research. The second will be with student project teams on a business game module. The second study will provide a comparison.

#### 3.1 British Sugar Study

British Sugar is facing a rapidly changing external business environment due to upcoming changes in the European Agricultural Policy which will open up the world sugar market (Ward et al. 2008). To maintain competitiveness, British Sugar has developed an international sustainability strategy which involves using the construction of innovative second generation green fuel technology plants to power their factories with the aim to reduce production costs for refined sugar in line with the wholesale cost per ton from Brazil. British Sugar wants to improve its ability to create and manage project teams that can deliver capability-raising changes in line with business objectives. Thus, the research problem under consideration is how to quickly select and develop effective management-level project teams within British Sugar. The teams are tasked with implementing large capital investment projects and are temporary, in that they are short-term teams.

An individual level cross-sectional between-groups and longitudinal within-groups design will be used to evaluate how FA is related to interpersonal skills and how the skills relate to longitudinal performance in real-world project teams in an organisational setting. Data will be collected at three time points over the course of a year. FA measurements will be taken (see Figures 2) and a questionnaire will be distributed to project team participants at Time 1 which will assess their interpersonal skills ability, prior teamwork experience and training. Other demographic data will be collected for control purposes (e.g. age, job level, job function, personality). As well as questionnaire data on interpersonal skills, peer ratings of will also be collected and team meetings will be observed and independently rated to assess whether scores on the self-report measures relate to practice which will provide ecological validity and allow for more in-depth assessment of the relationship between FA and actual demonstration of interpersonal skills. The results will be analysed and feedback from the research will be provided to the team members. The project teams will then be split into two cohorts. One cohort will receive training on interpersonal skills initially following which Time 2 data will be collected. The second cohort will receive the training between Time 2 and 3 data collection points. The aim of this is to be able to assess the effect of training whilst not adversely affecting any of the team members in the long run. Outcome measures will also be collected at all time points and will include objective measures of individual and team performance from the company as well as subjective team level measures of cohesion and trust.

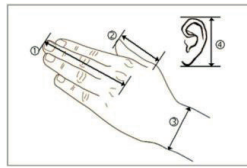


Figure 2: Diagram of FA measurements taken to calculate the composite FA score. (1), measurements taken for the index, middle, ring and little fingers. (2) Length of thumb. (3) Width of wrist. (4) Ear length. All measurements are taken in mm using a manual calliper.

### 3.2 Business Game Study

This will be a replication of the British Sugar study but with a group of first year undergraduate business game students. The aim of this study is twofold; firstly it will provide a comparison group who are likely to have little or no prior teamwork experience or training which will allow for a clearer understanding of the moderating effect of training on the FA-Interpersonal skill relationship. Secondly the larger size of Study 2 should also allow for more in depth statistical analysis of any relationships identified within the British Sugar study. The quantitative methodology and measures will be the same as used in Study 1 (although performance measures will be based upon simulation performance and module marks).

### 3.3 Methodological Challenges

There are a number of methodological challenges inherent in this research project. Firstly, there is design challenge of a longitudinal quasi-experimental design in controlling for extraneous variables and making causal inferences. To address this issue, the replication of the British Sugar study with the Business Game study will help by providing a ‘no prior training’ comparison condition. The main focus in the design of this research was to consider how the partner organisation would be able to use the results of the research and it is for this particular reason that an intervention design was chosen to allow for both academic and practice contributions although this research is only looking at project teams and so findings cannot be generalised to other types of teamwork.

Another challenge is in the choice of data collection measures and methods. At the present time there is only one self report measure that is currently used for assessing interpersonal teamwork skills and that is the Stevens and Campion (1999) Teamwork KSA test which has mixed results from its usage. Significant results have been found with organizational production teams (e.g. Leach et al. 2005; Morgeson et al. 2005; Stevens & Campion, 1994), student project teams (e.g. Ellis et al. 2005; McClough & Rogelberg, 2003) whereas O’Neil et al. (2012) did not find a relationship in an organizational setting and neither did Miller (2001) in a student setting. In order to ensure that the research is not reliant on one particular subjective questionnaire and to offset any potential weaknesses that stem from limitations of particular measurement techniques (Podsakoff et al. 2003), behavioural observation scales and peer ratings will also be used to assess interpersonal skills and will provide credibility to results obtained through subjective questionnaires as Behavioural observation scales (BOS) allow researchers to observe the actual skills use rather than solely relying on self-report or peer-rating measures. They have high test-retest reliability, observer reliability, and construct validity (Bernardin & Kane, 1980). The use of multiple measures also allows for triangulation of findings which increases the validity of the findings and will be completed by different participants and at different times thus reducing any potential comment method bias (Podsakoff et al. 2003).

There are also challenges associate with carrying out this research such as explaining the use of fluctuating asymmetry without participants feeling that their body dimensions could be used to determine job opportunities so it important to ensure clear briefs information is given to participants explaining that symmetry is not the only factor that has an effect, and that training can improve skill levels. It is also equally important to ensure that feedback to the company is only given at aggregate level. On the other hand, choosing to measure fluctuating asymmetry is easier when conducting research within an organisational setting than would be more complex cognitive neuroscience processes such as fMRI or EEG.

Another challenge of carrying out the research is engagement of participants. With student populations, participation can be enhanced through payment or participation credits. Within an organization it can be more difficult to access participants initially and then to keep them engaged across longitudinal research. It is important in this context to ensure that clear information is given to participants as to the benefits of the research and also individual confidentiality. With company partners it is also important to have clear expectations as to time frames as, for example data collection is not normally allowed in a PhD until after the completion of a year 1 qualifying report and ethics approval so company supervisors need to be aware of this limitation.

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