

Identifying the linguistic markers of intuition in human resource (HR) practice

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Abstract

Intuitions are judgements that arise automatically and non-consciously. Recognising when intuitive judgements are being used and whether doing so is appropriate is an important skill both for HR practitioners and managers involved in human resource (HR) processes. Because 'intuiting' is involuntary and unconscious it is difficult to access, monitor and control, however people can access and articulate their intuitive judgements through the spoken/written word. Identifying 'linguistic markers' of intuitions in spoken/written communications could help identify when/how intuition is being used in HR and improve HR practices in areas such as selection (e.g., obviating implicit/unconscious biases) and creativity (e.g., as a source of insights). This research used computerised text analysis (CTA) to identify linguistic markers of intuition based on HR practitioners' descriptions of what happens when they 'intuit'. We outline implications of these findings for improving HR decision-making processes and practices and their potential applications in data analytics, AI and machine learning in HR.

KEYWORDS

artificial intelligence, big data, decision-making, HR professional, intuition, qualitative research methods, selection, textual analysis

1 | INTRODUCTION

Intuitions are involuntary 'affectively charged judgements that arise through rapid, non-conscious and holistic associations' (Dane & Pratt, 2007, p. 40). Intuition is important in management in general and in human resource management in particular and has risen to prominence recently in both research and practice (Erez & Grant, 2014; Goings

et al., 2021; Highhouse, 2008; Hodgkinson & Sadler-Smith, 2018; Hodgkinson et al., 2009; Kim et al., 2021; Lodato et al., 2011; Miles & Sadler-Smith, 2014; Sadler-Smith & Burke-Smalley, 2015; Sadler-Smith & Sparrow, 2008; Sinclair, 2011, 2014; Vincent et al., 2019). Despite its many advantages, there are challenges associated with the use of intuition in human resource (HR) decision-making. For example, intuition creates the potential for implicit and unconscious biases in decision-making (Greenwald & Banaji, 1995). HR practitioners have been criticised for a 'stubborn' over-reliance on intuitive judgements despite the widespread availability of more scientific approaches (Highhouse, 2008, p. 333). But given that intuitions are involuntary, automatic, and unintentional judgements that operate outside of conscious control, it is reasonable to assume that they will always be part of HR decision-making processes. Therefore, the HR profession needs to arrive at ways of using intuition intelligently.

The starting point for a more informed and intelligent use of intuition is an awareness of if, and to what extent, intuition is being used and how its use affects HR outcomes. This represents challenges because of the unconscious nature of the process of 'intuiting' (Dane & Pratt, 2007). However, clues or 'markers' for if and how intuitive processing is being used are to be found in a person's use of language (Kim et al., 2011; Pennebaker et al., 2003). This research seeks to: (1) understand how HR practitioners put their intuitions into words; and (2) provide recommendations on how this information could be used to develop more skilful use of intuition in HR decisions and related processes. Our research question is: what are the linguistic markers of intuition in HR practice? This research provides a conceptual and methodological basis for the application of a novel technique that HR practitioners could use to capture and create value from linguistic data and use this information as a source of evidence for taking better HR decisions (Angrave et al., 2016; Rousseau & Barends, 2011).

1.1 | Background

Disagreements and tensions exist regarding whether intuition is the decision-maker's 'friend' or 'foe' (Myers, 2010). The extensive literature on 'intuitive expertise' (Kahneman & Klein, 2009; Salas et al., 2010) suggests that experienced decision-makers can, in specific circumstances, reasonably rely on their intuition to make effective decisions on the basis of pattern recognition (Simon, 1987), typically in 'high-validity' environments where there is inherent predictability between cues and outcomes (Kahneman & Klein, 2009, p. 519). 'Going with your gut' can save time and conserve scarce cognitive resources (in this respect it is an archetypal cognitive short-cut, i.e., a heuristic process).

On the other hand, a half-century of research into cognitive heuristics also suggests that intuitive judgements can be a significant source of systematic errors and biases in judgement and decision-making (Gilovich et al., 2002). For example, individuals engage automatically in intuitive categorisations that activate stereotypes as part of a process of impression formation (Deros & Ryan, 2019). When used indiscriminately and without the requisite experience and expertise, relying on intuition can create problems, especially in social cognition and social judgements, because of the unconscious biases resulting from implicit processing and attitudes (Greenwald & Banaji, 1995; Greenwald & Krieger, 2006). For example, it has been long-established that we intuitively like and are attracted to people who we perceive to be like us (Montoya et al., 2008), but the fact that we may be doing so, and the reasons for it, may not be known immediately to us or open to introspection.

The literature on implicit attitudes and unconscious biases suggests that intuition, especially in areas such as employee selection, is a potential source of bias, prejudice and discrimination (Buchtel & Norenzayan, 2008; Goings et al., 2021; Kausel et al., 2016; Reynolds et al., 2020). The fact that intuition is a potential source of unconscious biases, for example, relating to gender, creates problems for organisations because it may pass unnoticed in seemingly gender-neutral practices (see Ugarte & Rubery, 2021). Whilst cognitive biases are not usually available to consciousness, when automatic cognitive biases are brought to people's attention, decision-makers may be able to reflect on their potential effects on behaviours and outcomes. In so doing, they may be able to impose checks and balances and engage in 'self-censoring', thus preventing such processes and their attendant biases from undermining reasoning and judgement (Buetow, 2018, p. 10). Alternatively, this could be achieved through others noticing and intervening, or

even by a computer having some artificially intelligent means of identifying potential biases automatically and issuing an 'alert'. Moreover, exposing managers to the possibility of stereotyping and unconsciously biased decisions may help them to be more consistent and fairer in their decisions (Basuil et al., 2016; Ogbonna, 2019).

To use intuitive judgements effectively, intuitions need to be made sense of both intra- and inter-personally (Sonenshein, 2007). This raises a fundamental sensemaking problem because intuitive judgements are, by their nature, uniquely personal and subjective experiences. What it means to 'know' intuitively can only be known by intuitors themselves ultimately. However, almost all organisational processes (including intuitions and their interpretation, see Crossan et al., 1999) are accomplished in concert with other humans, hence intuitions in organisations have to be interpreted by the intuitor and communicated to others in order to describe, explain and justify one's choices and behaviours, and ultimately to take action. Because intuitions are personal and subjective experiences (Meziani & Cabantous, 2020), communicating them to a third party must entail the use of symbols, most typically, though not necessarily exclusively, by means of spoken or written language. So, what does it mean to know intuitively in HR practice, or phrased slightly differently, what do HR practitioners say happens 'when they intuit'?

Previous research has attempted to answer this question through manual analysis and interpretation of HR practitioners' written language (Sadler-Smith, 2016). However, the advent of computerised text analysis (CTA) in recent years opens-up many new possibilities and opportunities for the objective—and possibly the automatic—analysis of spoken and written language in diagnosing intuitive decision-making. The study reported in this article uses CTA to better understand what happens when HR practitioners intuit.

This research is relevant and contributes to HR theory and practice because it is important to: (1) know what someone else means when they say they have experienced a 'gut feeling', 'hunch' or 'vibe'; (2) be aware, as reflective practitioners, when we are and are not relying on our intuition lest we place too much or too little emphasis upon it; (3) acknowledge that too great a use of uninformed intuition may pave the way to unconscious biases, and hence prejudice and discrimination; (4) recognise that too little reliance on intuition might mean that we are overlooking, and therefore foregoing, a valuable source of knowledge and insight. To address these matters, it would be useful to be able to identify 'linguistic markers' of intuition in HR practitioners' language since the words they use serve as proxies for their inaccessible subjective experience and can be used to make more intelligent use of intuitions in HR decision-making.

On this basis, this article has three main aims: (1) identify and validate through the use of computer-based text analysis a set of linguistic markers for intuition in HR practitioners' language use; (2) propose ways in which the linguistic markers of intuitive language use could be detected in HR practitioners' spoken and written language; and (3) suggest practical applications for the diagnosis of intuitive language in HR practitioners' verbal and textual communications. Our research offers a theoretical contribution to HR decision-making and a methodological contribution to the use of computer-based text analysis in HR. As such, it connects to recent developments in the use of data analytics and artificial intelligence in HR and is of direct practical relevance to practitioners involved in HR decisions.

1.2 | Theoretical overview

In theorising intuition, management researchers typically use dual-process, also referred to as dual-system, theories in order to describe, analyse and predict intuition's role in a variety of organisational phenomena (for reviews in management see: Akinci & Sadler-Smith, 2012; Dane & Pratt, 2007; Hodgkinson & Sadler-Smith, 2018; Sadler-Smith & Burke-Smalley, 2015; Sinclair, 2011, 2014 and for a general review of dual-processing, see De Neys, 2017). Although dual-process theories come in a number of forms, they all share a core assumption that human information processing is accomplished in two contrasting but complementary ways by means of two substantively different, and differently evolved, types of thinking: 'one fast and intuitive [System 1], the other slow and deliberative [System 2]' (Evans & Stanovich, 2013, p. 223). The theory's duality was captured succinctly and metaphorically by Evans (2003, p. 454) when he referred to it as 'two minds in one brain'.

System 1 processes are contextually dependent, automatic, largely unconscious, associative, intuitive, and implicit in nature, and hence relatively undemanding in terms of their use of cognitive resources. This system has the ability to model other minds to read intentions and make rapid interactional moves based on those modelled intentions. In contrast, System 2 processes are contextually independent, analytic, rule-based, and explicit in nature, hence they are relatively slow and make greater demands on cognitive resources than System 1 (Stanovich & West, 2000).

System 1 is identified with the automatic operations of associative memory giving rise to biases in intuitive processing and judgement (e.g., as a result of the representativeness heuristic) that may consequently trigger stereotypes (Epstein, 1994; Kahneman & Frederick, 2002), causing decision-makers to automatically ascribe particular characteristics to certain types of people and form inaccurate or biased impressions and interpretations. As far as social cognition and HR decisions are concerned, System 1 processing displays two important features: (1) 'it [intuition] is rarely [if ever] stumped', and where it cannot automatically and effortlessly generate a skilled response, it will 'usually' produce an alternative response, often by construing the choice in terms of an easy-to-answer rather than a harder-to-answer question, whereas System 2 commonly 'runs into the sand' (Morewedge & Kahneman, 2010, p. 439); (2) because the operations of System 1 are faster than those of System 2, intuitive judgements precede rational, analytical judgements (e.g., in moral cognition), and are difficult to dislodge, so much so that analytical thinking may merely serve to confirm post hoc an involuntary intuitive judgement, for example, in moral decision-making (Haidt, 2001).

There are several variants of dual-process/dual-system theories (e.g., Epstein, 1994; Epstein et al., 1996; Sloman, 1996; Smith & DeCoster, 2000; Stanovich & West, 2000). For example, Sloman (1996) asserted that human reasoning is a function of two systems that are designed to achieve different computational goals. The 'associative system' operates reflexively and draws inferences from its environment by making use of the similarity between problem elements interpreted using such aspects of general knowledge as images, stereotypes, and prototypes. The complementary system described by Sloman (1996) in his version of dual-process theory is the 'rule-based system' which describes the world by capturing different kinds of structures that are logical, hierarchical, and causal-mechanical.

Epstein's Cognitive-Experiential Self-Theory (CEST; Epstein, 1994) is a dual-process theory that has been used extensively by business management researchers (e.g., Akinci & Sadler-Smith, 2013, 2019; Hodgkinson & Sadler-Smith, 2018; Sparks & Pan, 2010). This theory makes a distinction between the 'experiential system' (i.e., System 1; intuition is an experiential system process) and the 'cognitive system' (i.e., System 2; rationality is a cognitive system process). Epstein's theory is pertinent to intuition in HR decisions and related issues such as implicit cognition and unconscious biases, because the experiential system: (1) is oriented by what feels good (or bad) based on a hedonic principle; (2) relies on 'vibes' from past experiences; (3) encodes reality in concrete images; (4) uses broad generalisations based on stereotypical thinking; (5) is rapid, oriented to immediate action, slower to change, and is experienced passively and preconsciously (Epstein, 1994, p. 711).

As far as the practical question of the relationship between System 1/intuition and System 2/rationality in decision-making is concerned, a common-sense position would seem to be that intuitions should neither be ignored (arguably it is not possible to do so) nor trusted unreservedly (since intuitions work well only in certain situations under conditions of expertise, see Klein, 2011, 2015). As Nobel Laureate Herbert Simon remarked several decades ago, 'the effective manager does not have the luxury of choosing between 'analytic' and 'intuitive' approaches to problems', being an effective decision maker requires a command of both intuition and analysis (Simon, 1987, p. 63). Likewise, the effective HR practitioner must be able to use both intuition and analysis skilfully, and problems arise when one or the other dominates in tasks or situations to which it is ill-suited.

Intuition presents both opportunities and challenges for HR. Intuition presents opportunities for HR because it is a unique way of utilising practitioners' domain-specific expertise and learning from previous experiences. Amongst its advantages are that it is a fast and efficient way of taking decisions, especially in uncertain or ambiguous situations that rely on tacit knowledge and require quick judgements. However, it also creates challenges and has concomitant disadvantages especially in those aspects of HR practice that involve social cognition and social judgement, such as employee selection. For example, correlations between attraction towards another person and perceived similarity of that person are statistically significant and large, irrespective of whether there is no interaction with that person,

a short interaction, or an existing relationship (Montoya et al., 2008). Implicit attitudes, which are the product of System 1 thinking, have been shown to influence success in job applications (Bertrand & Mullainathan, 2004; Watson et al., 2011). A person's implicit theories, for example, stereotypes (which are typical of System 1 processing), may lead them to believe that observable cues correlate with underlying psychological traits and these unconscious, implicit beliefs can lead to inaccurate estimations of a person's personality, skills, abilities and so forth (Gawronski et al., 2010; Kahneman & Frederick, 2002; Kramer, 2009; Nosek et al., 2011).

Other biases such as confirmation bias (automatically testing a judgement by considering more confirmatory evidence than contrary evidence), the 'better-than-average effect' (unconsciously arriving at upwardly biased estimates of a socially desirable attribute or skill), 'unrealistic (illusory) optimism' and 'over-confidence' (see Gilovich et al., 2002) are also arrived at intuitively on the basis of unconscious processing and implicit knowledge. Their potency is such that at times it may be hard to tell which of our 'two minds in one brain' (analytical or intuitive) is actually calling the shots (Evans, 2010). But through introspection and reflection it may be possible to arrive at insights as to the extent to which intuition is in the driving seat, and through reflection, inquiry and dialogue come to an informed judgement as to whether or not this is appropriate. Thus, implicit processes and biases may become explicit and more malleable through conscious processes that are mobilised via language. The words we use provide insights and 'honest signals' (Pentland & Heibeck, 2008) into our deeper cognitive processes (including intuition). The advent of CTA software has enabled fast, effective and scalable analysis of honest signals in a person's linguistic utterances.

1.2.1 | Language, linguistic markers and computerised text analysis (CTA)

Given that 'words are the central feature of social, clinical, personality, and cognitive psychology' (Pennebaker et al., 2003, p. 572), they can be used to analyse and interpret individuals' psychological processes and behaviours across a wide variety of contexts. Analyses of spoken and written communications to identify 'linguistic markers' as proxies for underlying cognitive/affective processes, personality style and social integration (Pennebaker & Graybeal, 2001, p. 91) is now well-established in a voluminous body of literature across a variety of domains (for reviews and sample applications see: Holtzman et al., 2019; Pennebaker et al., 2015).

One method for identifying linguistic markers relies on 'word count' approaches which tally words within a given text sample in pre-defined categories of interest (e.g., pronouns, verbs, positive emotion words; Pennebaker et al., 2003). Specific methods vary according to what exactly is intended to be captured. Some approaches count the frequency of any word or word compound in a given text for comparison purposes (i.e., standard grammatical units such as prepositions, derived linguistic dimensions such as emotion words) whilst others tend to focus on certain linguistic aspects of the text (i.e., word patterns, verbal tone). Word count approaches were developed as a way to help researchers capture information that is not visible in usual social situations simply because people are too involved in the communication exchange, hence are not able to monitor specific aspects of a speaker's word use (i.e., counting personal pronouns throughout one's conversation). Moreover, individual differences in written and spoken word use tend to be 'stable across time and context' (Fast & Funder, 2008, p. 335).

Most word count approaches are computerised (hence computerised text analysis, CTA hereafter) and several word count software packages have been developed to capture specific aspects of language use. There are several benefits associated with the use of the CTA, namely speed (fast compared with other techniques, e.g., close reading), reliability (not dependent on human judges), precision (enables comparison between different samples) and scalability (can be used on large data sets), and they are comparatively inexpensive. Several such software packages are available including Pennebaker's Linguistic Inquiry and Word Count (LIWC), DICTION, The General Inquirer, ProfilerPlus, Yoshikoder, and Tropes. CTA has been used successfully in previous management and leadership research (Akstinaite et al., 2021; Amernic et al., 2010; Craig & Amernic, 2014; Garrard et al., 2014) as well as in more general personality research (Carey et al., 2015; Craig & Amernic, 2014). CTA has yet to be applied widely in HR research and practice (see Brandt & Herzberg, 2020 for one example).

LIWC was chosen in preference to other software packages for the following reasons: (1) functionality of the other packages does not support, or is not applicable for, this research (i.e., the need to do word counts in psychologically relevant categories); (2) use of linguistic dimensions that are not applicable for this research; and (3) dictionaries used for reference in the other software packages are not well-aligned with the aims of organisational behaviour research. Moreover, LIWC is based on a substantive theory, that of natural language use (Pennebaker et al., 2014, 2015) which posits that the words people use provide linguistic markers of cognitive processes, personality style and social integration (Pennebaker & Graybeal, 2001). Furthermore, LIWC and its theory are particularly useful in the study of intuition from a dual-process perspective because, as Jordan and Pennebaker (2017, p. 313) discovered, analytic (System 2) thinkers tend to use more 'nouns, articles, and prepositions' whereas intuitive (System 1) thinkers tend to use more 'pronouns, auxiliary verbs, and adverbs'. Hence, LIWC appears to be well-positioned for identifying individual differences in intuitive-analytical thinking aligned to a dual-process theoretical architecture. Finally, the choice of LIWC for this research is supported by recent successful applications of the technique in business and management research (e.g., Akstinaite et al., 2020; Brandt & Herzberg, 2020; Obschonka & Fisch, 2018; Pennebaker et al., 2014).

LIWC provides the results for two types of analyses: (1) percentage of total words: most of the LIWC output variables are percentages of total words, for example, an analysis of a portion of text which gave a 'causation' score of 4.25 means that 4.25% of all words in the text were 'causation' words within the 'cognitive process' category; (2) summary language variables: each of the summary language variables ('analytical thinking', 'clout', 'authenticity' and 'emotional tone') are based on algorithms derived from previous research with results presented as standardised scores converted to percentiles ranging from zero to 100 (for more information see <https://liwc.wpengine.com/interpreting-liwc-output/>). For details of how the algorithms were developed and are computed see: Cohn et al. (2004), Kacewicz et al. (2013), Newman et al. (2003), Pennebaker (2011), Pennebaker et al. (2014), and Tausczik and Pennebaker (2010).

2 | METHOD AND SAMPLE

We conducted a Main Study (with HR practitioners) and a Validation Study (with final year business management undergraduates). For the Main Study, our data collection process took place during a number of professional development workshops organised in conjunction with the local branch of the Chartered Institute of Personnel and Development (CIPD). They were voluntary evening sessions that people attended for a variety of motivations (personal interest, Continuing Professional Development [CPD], etc.), the style was informative and interactive, and they took place in a university business school. During these workshops, we invited our participants, human resource practitioners (124 participants in total across five seminars; 58% female, 33% male, and 9% undeclared), to tell us 'what happens when you intuit?'. At the beginning of each seminar (i.e., before the exposition of any substantive content) participants were requested to complete, in writing, the statement 'when I intuit...' in response to the question 'what happens when you intuit?' (in professional settings). We de-nominalised 'intuition' into 'intuit' in order that participants might be able to reflect more directly and personally on the processes and outcomes of intuition (Dane & Pratt, 2007) thereby facilitating access to subjective experiences of intuition and thus rendering its 'deep structure' (Harman & O'Neill, 1981, p. 450) more transparent (Tosey & Mathison, 2010). Our data were written, not spoken. Participation was voluntary, and anonymity was guaranteed. Completed forms were collected at the end of the workshop, and responses were typed-up verbatim in MS Word. The data set was 124 individual responses; these varied in length from six words to 44 words. These text units were combined into a single text corpus since by themselves they would be of insufficient length to permit computerised analysis nor would they yield the general linguistic markers of HR practitioners' intuitions that this study sought to determine. The final data set in this study consisted of a total of 2021 words.

For the Validation Study, the same method was used but this time in the context of a class on the topic of intuition as part of a final year module in managerial decision-making. The procedure was the same in that participants were asked to complete the statement 'what happens when you intuit' at the beginning of the class. The format and style

of delivery were similar to that of the main study workshop. Data were collected by the first and third authors. In the validation sample ($N = 175$), there were 119 females (68%), 49 males (28%), and seven gender non-declared (4%).

2.1 | Data analysis

The Word file was used as the input to the LIWC CTA software. The text output from LIWC was then transferred to MS Excel for coding, sorting, and tabulating. The HR practitioner data were previously used in an earlier study conducted by the first-named author with different research questions and analytical methods. Moreover, the research reported in the present article was conducted prior to recent advancements in and widespread availability of software tools for the computerised analysis of texts (i.e., LIWC, 2015) and which made the present research possible. The text corpora for the Main and Validation Studies are available from the first-named author on request.

LIWC counts words in 93 different dimensions. In this research, we focused on selected theoretically relevant variables (see Table 1) since these offer the greatest potential for the identification of linguistic markers of relevant cognitive processes (intuition and those related to it) without being obscured by noise in the data emanating from a much larger number of linguistic dimensions (many of which were not relevant to the aims of the study nor were they theoretically relevant). The present study analysed scores for LIWC's four summary variables (analytical thinking, clout, authenticity, and emotional tone) and also for seven main LIWC language categories (consisting of 27 sub-dimensions) which are functionally relevant to intuitive processing, for example, cognitive processes (to capture System 2, i.e., more rational/analytical, processes), affective processes and bodily/perceptual processes (to capture System 1, i.e., more affective/intuitive, processes). LIWC's summary language variables (see above) are presented as standardised scores converted to percentiles ranging from zero to 100¹ Scores for summary language variables and relevant LIWC language categories were compared to the 'grand mean' which is a score for the same categories for a general population obtained from the LIWC website (see: <https://liwc.wpengine.com/compare-dictionaries/>).²

2.2 | Main study results

Results are presented in Table 1. As noted above, scores for 'summary language variables' are computed by the LIWC software using proprietary algorithms. The scores for the remainder of the LIWC dimensions are percentages of total words, for example, 9.95% of words used were personal pronouns. Scores for each of the LIWC dimensions (including those for the summary language variables) were compared with the dimension's published 'grand means' (Pennebaker et al., 2015) by means of an 'Intuition Index' (i.e., the ratio of the observed score for each LIWC dimension to the published grand mean score):

$$\text{Intuition Index} = \frac{\text{LIWC dimension score}}{\text{LIWC dimension grand mean}}$$

An Intuition Index score of 1.00 signifies that the observed score is equivalent exactly to the general population mean; Intuition Index values greater than 1.00 signifies that participants used a given LIWC dimension more than the general population in general language use; Intuition Index values less than 1.00 indicate that participants used a given LIWC dimension less than the general population in general language use. For example, words referring to 'positive emotions' were used by participants a factor of 0.65 times less (i.e., 35% less) than the general population's use of these words in general language use, whereas personal pronouns were used a factor of 1.27 times (i.e., 27%) more.

LIWC dimensions were then ranked by Intuition Index in descending order, see Table 2. Dimensions above the central value of 1.00 are 'positive markers' of intuitive language use, that is, they are used more by HR practitioners when describing intuition than by the general population in their general language use. The most positive markers of intuitive language use are in the upper portion of Table 2 (HR practitioners use more of these words when describing

TABLE 1 LIWC dimensions for intuition and grand means (intuition/grand mean)

Category	Dimension	Intuition	Grand mean	Index
Summary Language Variables	Analytic	53.06	56.34	0.94
	Clout	12.50	57.95	0.22
	Authentic	94.89	49.17	1.93
	Tone	39.48	54.22	0.73
Linguistic Dimensions	Personal pronouns	12.68	9.95	1.27
	Impersonal pronouns	7.60	5.26	1.44
	Articles	7.08	6.51	1.09
	Prepositions	12.83	12.93	0.99
Affective Processes	Positive emotion	2.40	3.67	0.65
	Negative emotion	1.44	1.84	0.78
Cognitive Processes	Insight	14.50	2.61	5.56
	Causation	4.87	1.40	3.48
	Discrepancies	1.15	1.44	0.80
	Tentative	4.75	2.52	1.88
	Certainty	1.85	1.35	1.37
	Differentiation	4.01	2.99	1.34
Perceptual and Bodily	See	0.44	1.08	0.41
	Hear	0.65	0.83	0.78
	Feel	4.12	0.64	6.44
	Body	1.76	0.69	2.55
Drives	Affiliation	0.38	2.05	0.19
	Achievement	1.24	1.30	0.95
	Power	1.42	2.35	0.60
	Reward	1.69	1.46	1.16
	Risk	0.92	0.47	1.96
Time Orientation	Past	1.19	4.64	0.26
	Present	16.01	9.96	1.61
	Future	0.96	1.42	0.68
Relativity	Motion	2.04	2.15	0.95
	Space	7.83	6.89	1.14
	Time	2.61	5.46	0.48

‘what happens when they intuit’), for example, the ‘feel’ dimension (part of the ‘perceptual processes’ category) includes words such as ‘feel’ and ‘touch’ (Pennebaker et al., 2015). The most negative markers of intuitive language use are at and towards the bottom of Table 2 (HR practitioners use less of these words when describing ‘what happens when they intuit’), for example, the ‘affiliation’ dimension (part of the ‘drives’ category) includes words such as ‘friend’ and ‘ally’ (Pennebaker et al., 2015). Positive markers are markers of intuition ‘by presence’ (what people *do* say); negative markers are markers of intuition ‘by absence’ (what people *don't* say; see Akstinaite et al., 2020).

The general picture which emerges of how HR practitioners describe their experiences of intuition is as follows (sample words from the *LIWC Language Manual* for each dimension are given in parentheses): (1) perceptual and bodily processes, that is, references to bodily feelings (e.g., ‘feel’, ‘sense’) and the physical body (e.g., ‘body’, ‘heart’); (2) insight related vocabulary reflecting the complementary cognitive processes of reason (e.g., ‘think’, ‘know’) and causation

TABLE 2 Linguistic markers ranked by intuition index (intuition/grand mean)

HR use more of these words when intuiting	
Feel	6.44
Insight	5.56
Causation	3.48
Body	2.55
Risk	1.96
Authentic	1.93
Tentative	1.88
Present	1.61
Impersonal pronouns	1.44
Certainty	1.37
Differentiation	1.34
Personal pronouns	1.27
Reward	1.16
Space	1.14
Articles	1.09
Prepositions	0.99
Achievement	0.95
Motion	0.95
Analytic	0.94
Discrepancies	0.80
Negative emotion	0.78
Hear	0.78
Tone	0.73
Future	0.68
Positive emotion	0.65
Power	0.60
Time	0.48
See	0.41
Past	0.26
Clout	0.22
Affiliation	0.19
HR use less of these words when intuiting	

(e.g., 'because', 'effect'); (3) risk (e.g., 'danger', 'doubt') and the seemingly contradictory cognitive processes of tentative (e.g., 'maybe', 'perhaps') with a degree of certainty (e.g., 'sure', 'certain'); (4) present-focus (e.g., 'today', 'is', 'now'); (5) the use of impersonal (e.g., 'it', 'its', 'those') and personal (e.g., 'I', 'my') pronouns; (6) authentic tone, a summary language reflecting the complexity and diversity of speech. Regarding the latter, authentic speech is complex and diverse, whilst inauthentic, including deceptive speech, is characterised by reduced complexity and diversity (Tausczik & Pennebaker, 2010), thus suggesting that intuitions are expressed with honesty and authenticity.

Participants' references to intuition as a bodily process is consistent both with previous research into intuitive judgements as an embodied 'way of knowing' (Meziani & Cabantous, 2020) and with references in the literature, and

colloquially, to 'gut feelings', 'hunches', and 'vibes' (Epstein et al., 1996). The feelings associated with intuition have been referred to as 'intuitive affect' and are distinct from primary emotions per se, such as fear, joy, and sadness (Damasio, 1999; Sadler-Smith, 2010). Participants described intuitions using insight (reasoning), and causation-related words. In the literature, the relationship between intuition and reasoning has been referred to as a 'false dichotomy' on the basis that expert intuitions are acquired through learning and experience and thus represent a form of reasoning in which intuitive decision-making is linked to analytical processes, albeit non-consciously and speedily (Easen & Wilcockson, 1996; Gobet & Chassy, 2008; Klein, 2011). At first glance, the cognitive processes of tentativeness and certainty are seemingly contradictory, however intuition, like rationality, should not mandate certainty about decisions (Moss, 2015). Deploying certainty with a degree of tentativeness is one way of arriving at a measured judgement; for example, in selection interviews, and as sub-categories of social perception, these two cognitive processes may enable decision-makers to naturally 'hedge' their intuitive judgements (Shoda et al., 1989). Danger and doubt may also augment, through a precautionary approach, hedging through tentativeness and certainty. Finally, the use of personal pronouns has been found to be associated with 'narrative, intuitive thinking' (Jordan et al., 2019, p. 3477) and is consistent with Epstein's Cognitive Experiential Self Theory (see above) in which experiential (System 1) processing is context-specific and associated with narratives.

Towards the bottom of Table 2, we observed the following LIWC dimensions to be relatively under-used, and hence we might expect to be notable by their absence in intuitive language use: (1) discrepancies (e.g., 'should', 'would'); (2) emotions (both positive and negative); (3) past and future orientations (e.g., 'ago', 'did', 'talked'; 'may', 'will', 'soon'); (4) references to power (e.g., 'superior'), the perceptual process of seeing (e.g., 'view', 'saw', 'seen'); and (5) finally, least-used were references to 'affiliation' (a dimension of 'drives', e.g., 'win', 'success', 'better') and 'clout', a summary language variable that is indexed to the speaker's relative status in a social hierarchy. Negative markers will not be considered further because whilst we know that our participants did use the positive markers, we cannot be confident that they do not use the negative markers (it may simply be that they chose not to do so on this occasion). Negative markers are most useful as a basis for comparison between specific groups that are conceptually related (e.g., different types of leaders, such as CEOs) rather than with the general population (Akstinaite et al., 2021).

In summary, a preliminary set of potential linguistic markers of intuition as identified in this research is as follows: words related to feeling and bodily sense, insight (reasoning), causations, tentativeness and certainty, authenticity, risk and present-focused, and pronouns. Although these linguistic markers of intuition were not necessarily found in each individual person's statements, they express the findings across the sample. However, before we can conclude tentatively that these are potential linguistic markers of intuitive processing, it is necessary to validate these findings on a different sample.

2.3 | Validation Study results

To validate the results obtained in the main study, we replicated the analysis on a different set of data as described in the 'Method and Sample' section above. Participation in this study was voluntary, anonymous and students did not receive any additional study credit for participation. Students who chose to participate wrote their anonymous answer to the question and put them into a box. Completed forms were then collected, and responses were typed verbatim in MS Word. The data set was 175 individual responses, ranging between seven and 58 words each. Responses were combined into a single text corpus. A final data set consisted of 3241 words. We used the same categories and computations as in the main study. Results are presented in Table 3.

Linguistic markers for the student data were then ranked based on Intuition Index from highest to lowest, see Table 4.

The results from the two samples are compared in Table 5 in terms of a 'Similarity Index' ($\text{Intuition Index}_{\text{main study}} / \text{Intuition Index}_{\text{validation study}}$). The mean Similarity Index was 1.06 (standard deviation, 0.42). Similarities of less than one standard deviation (i.e., between 0.64 and 1.48) are categorised as 'similar'; similarities of greater than one standard

deviation (i.e., <0.64 and greater than 1.48) are categorised as 'dissimilar'. Dissimilar dimensions are underlined in Table 5.

The findings and recommendations of the validation study are as follows: (1) 24 out of 31 (77%) of the markers are similar and 7 out of 31 (23%) are dissimilar; (2) the dissimilar markers are 'risk', 'certainty', 'reward', 'space', 'negative emotion', 'clout', and 'affiliation'; (3) we recommend that all dissimilar markers be excluded; (4) the validated list of linguistic markers by presence for intuition in HR are: 'feel', 'insight' (reasoning), 'causation', 'body', 'authentic', 'tentative', 'present', 'pronouns', 'differentiation', 'articles' (i.e., Intuition Index > 1.00; $0.64 \leq$ Similarity Index \leq 1.48).

The application of this method in HR practice would require further validation before the markers identified in this study could be used in HR decision-making. This would include: (1) the reproduction of these markers in different contexts, with different populations and larger sample sizes; (2) studies of the predictive validity of the markers in

TABLE 3 LIWC dimensions for intuition and grand means (intuition/grand mean) for student data

Category	Dimension	Intuition	Grand mean	Index
Summary language variables	Analytic	47.90	56.34	0.85
	Clout	7.45	57.95	0.13
	Authentic	93.73	49.17	1.91
	Tone	35.62	54.22	0.66
Linguistic Dimensions	Personal pronouns	14.04	9.95	1.41
	Impersonal pronouns	7.08	5.26	1.35
	Articles	7.34	6.51	1.13
	Prepositions	11.30	12.93	0.87
Affective Processes	Positive emotion	2.26	3.67	0.62
	Negative emotion	2.40	1.84	1.30
Cognitive Processes	Insight	12.82	2.61	4.91
	Causation	5.13	1.40	3.66
	Discrepancies	1.40	1.44	0.97
	Tentative	6.48	2.52	2.57
	Certainty	1.07	1.35	0.79
	Differentiation	6.05	2.99	2.02
Perceptual and Bodily	See	0.44	1.08	0.41
	Hear	0.65	0.83	0.78
	Feel	4.12	0.64	6.44
	Body	1.76	0.69	2.55
Drives	Affiliation	0.15	2.05	0.07
	Achievement	0.89	1.30	0.68
	Power	1.48	2.35	0.63
	Reward	3.64	1.46	2.49
	Risk	1.62	0.47	3.45
Time Orientation	Past	1.00	4.64	0.22
	Present	16.49	9.96	1.66
	Future	0.89	1.42	0.63
Relativity	Motion	2.40	2.15	1.12
	Space	5.21	6.89	0.76
	Time	3.92	5.46	0.72

TABLE 4 Linguistic markers ranked by intuition index (intuition/grand mean) for student data

Students use more of these words when intuiting	
Feel	6.44
Insight	4.91
Causation	3.66
Risk	3.45
Tentative	2.57
Body	2.55
Reward	2.49
Differentiation	2.02
Authentic	1.91
Present	1.66
Personal pronouns	1.41
Impersonal pronouns	1.35
Negative emotion	1.30
Articles	1.13
Motion	1.12
Discrepancies	0.97
Prepositions	0.87
Analytic	0.85
Certainty	0.79
Hear	0.78
Space	0.76
Time	0.72
Achievement	0.68
Tone	0.66
Power	0.63
Future	0.63
Positive emotion	0.62
See	0.41
Past	0.22
Clout	0.13
Affiliation	0.07
Students use less of these words when intuiting	

relation to outcomes; and (3) further refinements of the markers and, ultimately, the creation of an 'intuition in HR' lexicon (i.e., 'words to watch out for').

3 | DISCUSSION, IMPLICATIONS, LIMITATIONS AND FUTURE DIRECTIONS

Having determined, using CTA, a set of linguistic markers for intuition in HR practitioners' language, the practical questions now arise of: (1) how such markers might be detected in occupational settings; and (2) to what uses the detection of such markers might be put. Potential sources of linguistic markers are practitioners' written and spoken

TABLE 5 Intuition and similarity indices

Dimension	Intuition index		Similarity index
	Main study	Validation study	
Feel	6.44	6.44	1.00
Insight	5.56	4.91	1.13
Causation	3.48	3.66	0.95
Body	2.55	2.55	1.00
Risk	1.96	3.45	<u>0.57</u>
Authentic	1.93	1.91	1.01
Tentative	1.88	2.57	0.73
Present	1.61	1.66	0.97
Impersonal pronouns	1.44	1.35	1.07
Certainty	1.37	0.79	<u>1.73</u>
Differentiation	1.34	2.02	0.66
Personal pronouns	1.27	1.41	0.90
Reward	1.16	2.49	<u>0.47</u>
Space	1.14	0.76	<u>1.50</u>
Articles	1.09	1.13	0.96
Prepositions	0.99	0.87	1.14
Achievement	0.95	0.68	1.40
Motion	0.95	1.12	0.85
Analytic	0.94	0.85	1.11
Discrepancies	0.80	0.97	0.82
Negative emotion	0.78	1.30	<u>0.60</u>
Hear	0.78	0.78	1.00
Tone	0.73	0.66	1.11
Future	0.68	0.63	1.08
Positive emotion	0.65	0.62	1.05
Power	0.60	0.63	0.95
Time	0.48	0.72	0.67
See	0.41	0.41	1.00
Past	0.26	0.22	1.18
Clout	0.22	0.13	<u>1.69</u>
Affiliation	0.19	0.07	<u>2.71</u>

Note: Dissimilar markers are underlined (i.e., $0.64 \leq \text{Similarity Index} \leq 1.48$).

language including emails, interview notes, job descriptions, etc. (written); and in meetings, interviews, training courses, etc. (spoken). To be formally analysed, spoken communication needs to be captured and transcribed for analysis in LIWC. As an alternative to the systematic analysis of speech, a skilled facilitator could observe and record relevant linguistic markers of intuition and offer interpretation and feedback accordingly.

Take the case of recruitment and selection, for example. Structured interviews have higher validity than unstructured interviews (McDaniel et al., 1994). Moreover, unstructured interviews can produce biases towards certain

groups of job candidates (Brecher et al., 2006; Kausel et al., 2016; Purkiss et al., 2006). However, as noted in the introduction there is often a stubborn reliance on unstructured interviews and a general reliance on intuition in recruitment and selection (Highhouse, 2008; Lievens et al., 2005; Lodato et al., 2011; Miles & Sadler-Smith, 2014). By unconsciously selecting individuals who are like themselves, hiring managers risk violating principles of fairness, justice and equity, and creating an 'echo chamber' for their own beliefs and values (Sadler-Smith, 2019). In training, by playing the role of an interviewer in an unstructured interview, for example, as part of a recruitment and selection course, a trainee's spoken utterances could be either recorded, transcribed, and analysed or judged subjectively to assess the presence of intuition markers. Feedback could then be offered by the instructor on the extent to which the interviewer appeared to be using his or her intuition (based on the presence of linguistic markers) and strategies developed for overcoming an over-reliance on intuition, for example, by mobilising System 2 processes. As far as further validation is concerned, mock interviews could be recorded and analysed in terms of the identified markers and a debriefing conducted with the interviewer to determine the extent to which they really were relying on intuition and hence validate whether the categories identified really pick up intuitive processes as they are happening in vivo.³

Future research might also explore whether there are group differences in the use of linguistic markers of intuition, for example, between males/females, experienced/less experienced employees, etc. More generally, employees could be educated on the signs to look for in their own and others' language use which are indicative of intuitive thinking and judgement. The above is a starting point for the informed and intelligent use of intuition in HR whereby both intuition and analysis are used collaboratively and constructively, rather than oppositionally; in so doing an optimum outcome may be arrived at.

Aside from the example of the selection and training contexts, and on the technical side, a fully validated set of linguistic markers could be used to derive an 'Intuition Index' for an individual's linguistic utterances. For example, the scores for each of n linguistic markers (x) above a threshold value based on norms (for examples see Table 2) could be calculated as follows:

$$\text{Intuition Index} = \sum_{i=1}^n x$$

Intuition indices for an individual's utterances could be derived manually by an investigator conducting an LIWC analysis or automatically by computer-based monitoring and assessment on a given corpus of spoken or written texts (e.g., from web-based and social media platforms). Feedback could then be offered by an investigator or automatically by a machine algorithm on the level of intuition that is apparent from the individual's utterances (their personal Intuition Index) and recommendations offered and actions are taken, for example, in the form of a 'dashboard' or 'traffic light' early warning system.

This research has several limitations and various potential future directions. The way in which the question was phrased 'what happens when you intuit?' may have predisposed participants to use personal pronouns. To eliminate this as a potential source of bias, future research might explore different ways of framing the eliciting question. There may also be issues around social desirability, such as people consciously using rational words to mask reliance on intuition, for example, in the relative absence of emotional terms. Any further developments of this method would need to respond to this challenge. Future research might also focus on the under-used categories as well as on the over-used categories, for example, does an absence of terms related to 'seeing' imply a lack of consideration of evidence that may have been observed but overlooked?⁴

Although there are no generally accepted rules as to a 'good' number of words for linguistic analysis, the general agreement is that more words are always better for LIWC analyses (Pennebaker et al., 2015), therefore future research might adopt a method which invites participants to write or speak at greater length about their intuitive experiences. Although we cannot be confident that the markers here are unique to HR practitioners, we now know if and how they differ from the general population's means and the results allow us to conclude that other HR practitioners are likely to use these words when they talk intuitively.

A potential drawback is that content and context is not taken into consideration in the foregoing analysis of verbal behaviour. In other words, when using this type of analysis, the focus is shifted to linguistic style as opposed to linguis-

tic content. For example, the word 'happy' when taken out of context might infer 'I am not happy' rather than 'I am happy' which could be misleading (Fast & Funder, 2008). In addition, word count approaches do not take into consideration such language aspects as irony, sarcasm, or humour. It also does not allow for differences in culture, gender, education, or other aspects of language use (i.e., whether it is a mother tongue or a second language for a speaker). Future research would need to adopt a more nuanced approach to the elicitation of the markers to address these challenges.

4 | CONCLUSION

This research makes several contributions. Firstly, using CTA, it has identified a validated set of linguistic markers for intuition in HR (namely words in the feel, insight (reason), causation, body, authentic, tentative, present, pronouns and differentiation linguistic dimensions). Secondly, it shows that certain words can be a valid signal of intuitive processing and demonstrates how they manifest in language use, thus helping to build theory of the relationship between intuition and language. As Crossan et al. (1999) noted in their '4I' model (i.e., intuiting, interpreting, integrating, and institutionalising), the verbal interpretation of intuition through spoken and written language is the second link in an organisational learning process. Thirdly, this research contributes to HR practice by proposing a practical way in which linguistic markers of intuitive language could be detected in HR practitioners' spoken and written language. Such a technique could be used to improve current HR practices by ameliorating heuristics as a source of unconscious biases and improving HR practitioners' self-awareness. Fourthly, it proposes the use of an 'Intuition Index' which could help organisations to diagnose intuitive language in HR practitioners' verbal and textual communications as a measurable index for intuitive behaviours. One of the greatest enemies of the intelligent use of intuition is going with one's gut without realising that one is doing so (Sadler-Smith, 2010), therefore, the theoretical and practical implications of this study could help to not only mitigate this risk but improve current HR decision-making processes and outcomes more generally.

A number of the issues raised in and by this research are essentially metacognitive. On the basis that a quick and clear-cut intuitive decision is not always a right and accurate one, being able to consciously, that is, metacognitively, calibrate one's intuition: (1) involves an awareness of the language used to externalise one's gut feelings, hunches and vibes; (2) combines intuitive System 1 processes with analytical System 2 processes (e.g., by reflecting rationally and critically on the words one automatically and involuntarily uses); and (3) will improve decision-making competencies and outcomes in HR work (Ames et al., 2010; Miles & Sadler-Smith, 2014). By articulating intuitions verbally or textually and interpreting them in terms of the linguistic markers identified in this research, HR can contribute to better use of intuition in business decisions and improve its own practices in areas such as recruitment and selection.

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CONFLICT OF INTEREST

The authors have no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data are available from the first author upon request.

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ENDNOTES

¹ See <https://liwc.wpengine.com/interpreting-liwc-output/> for more information.

- ² Pennebaker's manual states that he and his colleagues have been sampling text since 1986 and the means reflect the utterances of 80,000 writers or speakers totalling over 231 million words.
- ³ We are grateful to two of our anonymous reviewers for this insightful suggestion.
- ⁴ We are grateful to one of our anonymous reviewers for this insightful suggestion.

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