Abstract

The affective events theory (AET) proposes that daily events elicit affective reactions on workers that, over time, influence affective and judgment-driven behaviours. It also suggests that this relation is moderated by dispositions and appraisals. On the other hand, the social interaction model (SIM) argues that the impact of emotions is moderated by how individuals regulate them. This study aimed to: 1) investigate what customer-related events elicit affect; 2) test the moderating role of workers' susceptibility for emotional contagion on the relation events-affect; and 3) explore whether affective states influence cardiovascular efficiency and turnover intentions. We conducted a longitudinal study in an inbound call centre by following 48 workers during 10 working days, gathering 267 events and 1232 affective reactions. We combined diaries, questionnaires and physiological data. Data was analysed qualitatively and quantitatively. We extracted 13 event categories and, using artificial neural networks (ANN), found support for the moderating role of emotional contagion. At daily level, fear was the stronger predictor of cardiovascular efficiency, whereas anger was the stronger predictor of turnover. ANN models showed satisfactory predictive values ($R^2_{Turnover} = .51$, $p < .01$; $R^2_{Cardiovascular\ efficiency} = .32$, $p < .01$). The importance of results for theory and practice are discussed.

Keywords: emotions at work, emotional contagion, customer behaviour, cardiovascular efficiency, turnover intentions.

Introduction

The call centre industry is in frank expansion, employing millions worldwide and presenting annual global growth rates of about 40% (Aldor-Noiman, Feigin, & Mandelbaum, 2009; Lin, Chen, Hong, & Lin, 2010). Despite its accelerated expansion and contribution to global economy, this industry has a widespread negative reputation as a place to work (e.g., Nadeem, 2009). This negative reputation is backed up by exuberating voluntary turnover rates and by the fact that its workforce has some of the lowest health levels among all (e.g., Holman, Batt, & Holtgrewe, 2007).

Scholars and practitioners have identified potential factors threatening workers' welfare as to being mostly related to job design such as high targets and pervasive performance monitoring, as well as high emotional and physical demands (e.g., Castanheira & Chambel, 2010; Gavhead & Toomingas, 2007). However, literature is controversial about a direct relation between job characteristics and workers' attitudes and behaviours. For example, the affective events theory (AET; Weiss & Cropanzano, 1996) states that it is the workers' affective reaction to daily events experienced at work that will shape (mediate) their attitudes and behaviours towards the job. The social interaction model (SIM; Côté, 2005) complements this idea by emphasizing the importance of social exchange dynamics for emotional experience, suggesting that it is the events related to the interaction with others, more than the events that are not (e.g., technical problems at work), that will evoke more complex emotional reactions. The emotions passed from one individual to another communicate different attitudes, goals and intentions that will elicit discrete emotions, and therefore individuals are more emotionally "expressive when they are with others than when they are not" (Côté, 2005 p. 515). Moreover, the SIM postulates that emotions exchanged and experienced from interpersonal interactions involve the externalization of said emotions, this is, individuals communicate them not only verbally but mainly through nonverbal channels such as muscular activity, postures or non-verbal aspects including velocity of speech or tone of voice. This proposition is also in line with the emotional contagion theory (Hatfield, Cacioppo, & Rapson, 1994), which postulates that social interactions are rich in emotional exchange. This theory defends that, when interacting, individuals are constantly and involuntarily influencing, and being influenced by, the emotional displays of one another through non-verbal signs of emotion. Although this theory firstly arose in the field of clinical psychology, it soon gained attention of organisational researchers, who found it to play an important role in several organizational contexts, particularly in service encounters (e.g., Pugh, 2001, Barger & Grandey, 2006).

We aim to consider together all these theoretical frameworks in order to test a comprehensive model of turnover and health in call centres (See Figure 1). More precisely, we will focus on the impact of social interaction daily events, related to customer behaviour, on workers' affect, controlling for the moderating role of workers' propensity for emotional contagion. Various field and laboratory studies demonstrated that customers' displays influence workers' emotions (e.g., Dallimore, Sparks & Butcher, 2007; Zimmermann, Dormann, & Dollard, 2011). However, it remains to be explored what specific types of customer behaviour are more influencing and what specific affective reactions they elicit. We also intend to explore what effect emotional contagion exerts on this relation. Empirical evidence supports individual differences regarding the susceptibility to involuntarily mimic and consequently converge with outward emotional displays of others (e.g., Doherty, 1997; Ilies, Wagner, & Morgeson, 2007). In this study we aim to explore how different levels of propensity for contagion (low vs high propensity) influence on the relation between the exposure to events and consequent emotional responses.

From a practical standpoint, an in-depth understanding of customer behaviour holds promise for companies to develop training strategies (e.g., role play) to better prepare workers to deal with it (e.g., deep acting regulation of emotions by appraisal learnings). From a theoretical perspective, it adds to the AET framework by scrutinizing categories and impacts of social-related daily events, as proposed by the SIM, and therefore developing knowledge on the antecedents of affect at work. Additionally, we can also add to the AET framework the inclusion of one dispositional element (i.e., the propensity for emotional contagion) to better understand under what conditions, i.e., levels of contagion, events produce affective reactions at work.

Moreover, and following the AET proposals, we will explore the effects of customer-elicited affective reactions on workers' turnover intentions, an example of judgment-driven behaviour, because turnover intentions are mediated by evaluations of the job. It is pivotal to explore in depth the antecedents of turnover intention as (1) they are the most proximal psychological precursors of turnover (Griffeth, Hom, & Gaertner, 2000); (2) organizational costs related to hiring and training in call centres are extremely high (e.g., Aksin, Armony, & Mehrotra, 2007); and (3) human capital is a company's only sustainable long-term competitive advantage, as other resources like technology are easily replicable (Sexton, McMurtrey, Michalopoulos, & Smith, 2005).

In an attempt to go beyond, and not only consider attitudinal constructs, we will explore the effects of affective reactions on cardiovascular efficiency, a measure of physical energy expenditure having a long

tradition in our field from the classic work of Mayo and colleagues (Mayo, 1933; Roethlisberger & Dickson, 1939). Although medical studies have supported that affective states influence cardiovascular health in the long-term, to our knowledge there is a lack of research on the relation between episodic emotions experienced at work and daily levels of cardiovascular efficiency. Further, we are only aware of one study that related cardiovascular efficiency at work (hereby operationalized as the pulse product, which will be described lately) with individual subjective/internal experiences (i.e., psychological well-being, Wright, Cropanzano, Bonett, & Diamond, 2009). However, this study followed a cross-sectional design, which jeopardizes any attempt of establishing a causal relation. To explore the relation between affect and health in the workplace may help both organizations and employees saving costs that are increasing every year, since "affect permeates organizations" (e.g., Barsade & Gibson, 2007, p. 36) and cardiovascular disease is affecting more and more people around the world (e.g., Wright & Diamond, 2006; Wright, Cropanzano, Bonett, & Diamond, 2009).

Finally, and according to the postulates of the AET and to recent literature emphasizing the need to do a research that is more sensitive to temporal issues, because organizational behaviour happens in time and evolves over time (e.g., Navarro, Roe, & Artiles, 2015), we tested our model under a dynamic and longitudinal approach in order to capture realistically the evanescent nature of the relations between the phenomena of interest.

Exploring Specific Categories of Customer-Related Events, and Their Impact on Workers' Emotions

Service interactions can be compared to social relations, where two or more individuals exchange not only products or services, but also emotional information (e.g., Hochschild, 1983). Although knowledge on affect in service interactions has been traditionally focused on customers (e.g., customer affect seen as a tool to achieve outcomes like repurchase intentions), a new stream of research is ever more concerned with the impact that customers' affective displays have on employees' welfare (e.g., Dallimore et al., 2007; Kiffin-Petersen, Murphy & Soutar, 2012).

Customer service involves a high frequency exposure to different types of customers' behaviours that, inevitably, impact on workers' emotions (e.g., Kiffin-Petersen et al., 2012). To achieve a comprehensive understanding of said behaviours, researchers must respond to the calls of different scholars for exploring in detail the specific events that comprise broader categories of behaviours, instead of focusing on general hassles and uplifts (positive vs negative interactions, see, e.g., Maybery, 2003). The scrutiny of

these events is relevant as social interaction is a rich and complex source of emotional interchange, and separate events arouse different discrete emotions (see Côté, 2005).

Although some authors attempted to do so, there are relevant limitations that must be dealt with, such as (1) using data from pools of participants belonging to distinct job types and industries, missing important and refined information that is inherent to specific work contexts (see, for an exception, the works of Hart, Wearing and Headley [1993, 1994] who developed a daily hassles and uplifts checklist for police officers; and Basch and Fisher's [2000] classification of work events and associated emotions for a sample of hotel workers); (2) using students working in unspecified part-time positions, which makes generalization nearly impossible (e.g., Grandey, Tam, & Brauburger, 2002); and (3) creating general and broad categories of work events, like "problems in interactions with clients or patients" (Ohly & Schmitt, 2013) without providing information on the underlying specific events that comprise each dimension. The recent investigation of Kiffin-Petersen and colleagues (2012) provided specific categories related to employees' positive experiences during customer interactions. However, the categories reflected both customer and employees' behaviours and were only focused on the positive aspects of service relations.

The first objective of this study is therefore to explore the specific events related to customer behaviour, on a specific work setting (inbound call centre) using data collected *in loco*, longitudinally, and therefore more resistant to memory biases. In the light of empirical findings supporting that specific events link to different affective responses (e.g., Weiss & Cropanzano, 1996; Kiffin-Petersen et al., 2012; Lazarus, 1995) we intend to explore the extent to which specific customer-related events impact on workers' discrete affective experiences. The advantage of exploring discrete emotions, instead of general affect (negative *vs.* positive) is that, whereas the former comprises specific and intense responses to specific events (i.e., emotions can be linked to their causes and consequences), the latest is diffuse and can occur without a specific cause (e.g, Ashkanasy, Hartel, & Daus, 2002; Warr, Bindl, Parker, & Inceoglu, 2013). In fact, different authors have been calling for more research on the experience of discrete forms of affect at work. This is also due to the poor results from meta-analysis on the relation between affect valences and job outcomes, which shown only modest correlations between them (e.g., Kaplan, Bradley, Luchman, & Haynes, 2009).

The Moderating Role of Workers' Susceptibility for Emotional Contagion

According to the AET, appraisal tendencies and others stable individual features may moderate the relation events-emotions (e.g., Holtom, Burton & Crossley, 2012). The study conducted by Kiffin-Petersen and colleagues (2012) shyly suggested that emotional contagion seemed to influence the link between events-emotions. We say shyly because this relation was only proposed by the authors, as an interpretation of the results, and not directly tested.

Emotional contagion is an automatic and involuntary process happening in two phases. First, due to biologic reactions related to the firing of mirror neurons, individuals inadvertently mimic others' nonverbal signs of emotions. Afterwards, through a process of afferent feedback, i.e., the process by which information from the peripheral nerves is sent to the brain, the mimicker converges emotionally (e.g., Meltzhoff & Moore, 1992). Although this phenomenon has been mostly explored in face-to-face interactions, where individuals mimic the visual cues of displayed emotions (e.g., facial expressions, postures), a smaller (yet as interesting) line of research also supports the existence of this phenomenon in contexts where visual cues are not available (e.g., in contexts where only verbal cues appear). For example, regarding the feedback hypothesis, a pioneer line of research conducted by Zajonc, Murphy, and Inglehart (1989) found that, when producing certain sounds in verbal communication, individuals experience the emotion associated to the muscular activity involved in the production of said sounds. For example, individuals asked to make a long 'e' in 'cheese' (and consequently make a smiling expression) would report more positive emotions, while those asked to make the German 'u' (disgust expression) would report more negative ones. Regarding the mimicry hypothesis, a recent study conducted by Rueff-Lopes, Navarro, Caetano and Silva (2014) supported that emotional contagion also occurs in voice-to-voice interactions. The authors analysed 8747 sequences of emotional displays occurring between customers and employees in 957 phone calls in a call centre context. Results from transitional probabilities analysis (i.e., Markov chains analysis) supported that mimicry is significantly present.

Additionally, although most studies on contagion in service encounters were focused on how employees could influence customers (e.g., Verbeke, 1997), there is evidence supporting that customers can influence employees too (e.g., Dallimore et al., 2007; Zimmermann et al., 2011). Kiffin-Petersen and colleagues' (2012) study was pioneer in suggesting the inclusion of emotional contagion in the AET framework, however, its moderating role ought to be empirically tested.

We propose that the construct should be treated as a trait rather than a process, in the sense that individuals vary in the extent of their susceptibility to catch and to send emotional information, as several studies empirically showed (e.g., Doherty, 1997; Lundqvist, 2008). Considering the above mentioned, we hypothesize that:

Hypothesis 1a: Those with higher levels of susceptibility for emotional contagion would be influenced by more events in general than individuals with lower levels of susceptibility for emotional contagion.

Hypothesis 1b: Those with higher levels of susceptibility for emotional contagion would experience a more intense affective reaction to events than individuals with lower levels of susceptibility for emotional contagion.

Affect and Turnover Intentions

The call centre industry is extremely vulnerable to the high costs of turnover rates (Wright & Bonett, 2007). Specific characteristics of call centre work, like low job autonomy and few opportunities for career growth were found to increase turnover intentions (e.g, Ahuja, Chudoba, Kacmar, McKnight, & George, 2007). However, very few studies have considered the influence of interpersonal relations and workers' emotions on individual turnover decisions (Pfeffer, 1991). Two exceptions are (1) the work of Felps and colleagues (2009), who considered the relations with work colleagues as sources of influence to turnover decisions, creating a model of "turnover contagion", and (2) the model of voluntary turnover and embeddedness developed by Mitchell, Holtom, Lee, Sablynski and Erez (2001) which considered the overall interpersonal links people have in and outside their jobs as capable of enmeshing people in their posts.

Based on these few evidences about the importance of social relations to turnover, we will focus on the affective experiences elicited by customer interaction as precursors of voluntary turnover intentions. This is in line with the AET proposition regarding the mediating role of affective experience between events and attitudes (Weiss & Cropanzano, 1996). Previous studies found a correlation between negative affective experience and turnover intentions, including emotional exhaustion (Grandey, Dickter & Sin, 2004), emotional labour (e.g., Brotheridge & Lee, 2003; Côté & Morgan, 2002), and low levels of psychological well-being (Wright & Bonett, 2007). There is also a solid line of research on the influence of negative affect on withdrawal tendencies from unpleasant, threatening or uncomfortable situations, by narrowing the thought-action repertoire and prompting the individual to act in order to preserve self-integrity (e.g.,

Fredrickson, 2001). However, these studies were conducted with cross-sectional designs, which threaten the validity of results. According to the AET, the relation between affect and attitudes occurs over time so in order to propose a relation that fits the theoretical propositions of this theory, both the design and the methodology have to follow its principles. Based on the above-mentioned, we hypothesize that:

> *Hypothesis 2a: Negative affect aroused by customer-related events will positively predict turnover intentions.*

Most conflict research considers person-related work events (as opposed to policies and procedures) as having more impact on turnover (e.g., Harlos, 2010). These person-related events have been mostly found to incite workers' experience of anger, as they are often perceived as threats or attacks and anger seems to have a protective function in such situations (e.g., Basch & Fisher, 2000). In fact, anger was identified as one of the most experienced emotions in the workplace (Fitness, 2000) and different studies have supported its frequent occurrence in customer service contexts (e.g., Bolton & Houlihan, 2005). Moreover, research suggests that the most common anger-related action tendency of lower status employees is one of withdrawal (e.g., Fitness, 2000). Additionally, the stressor-strain turnover approach suggests that hindrance stressors lead to emotions and cognitions that promote physical and emotional withdrawal from the job and such stressors were shown to elicit emotions like anger (Shaver, Schwartz, Kirson, and O'Connor, 1987). Further, a study conducted by Harlos (2010) found that when workers described interpersonal interactions that led to quitting intentions, words associated to anger (such as "hate") were significantly reported.

In call centre work, anger episodes may be especially important to employees' turnover intentions given that occupations involving high frequency personal interaction are strongly related to anger experiences (Sloan, 2004). Moreover, anger is one of the most contagious emotions given the overt nature of its expression, the easiness to identify it in others, and how strongly it captivates attention when compared to other emotions (e.g., Eastwood, Smilek, & Merikle, 2003). Given the evidence hereby exposed, we hypothesize that:

> *Hypothesis 2b: In comparison to other emotions, anger will be the strongest predictor of turnover intentions.*

Affect and Cardiovascular Efficiency

Work and organizational research continuously reports the alarming low levels of health among call centre workers (e.g., Holman et al., 2007). Reasons such as sedentary daily routines, poor ergonomic

conditions, and job stress have been pointed as the principal causes of low health levels (e.g., Rameshbabu, Reddy, & Fleming, 2013). Although it is still in its infancy, health research in call centres presents several gaps that ought to be filled. For example, to our knowledge (1) they all assume linear relations (e.g., Tuten & Neidermeyer, 2004), meaning that alternative relations among the variables (e.g., nonlinear relations) are managed as error variance; (2) nearly all studies use self-reported health data, which is often influenced by psychological traits and social desirability biases (Anastasi & Urbina, 1997); (3) health symptoms are often not discriminated, being aggregated under a dichotomous value 'positive/negative' or 'happened/did not happen' (e.g. Finch, Baranik, Liu & West, 2012); and (4) cross-sectional designs favour the occurrence of spurious correlations between predictors and outcomes (Wright & Diamond, 2006). The improvement of health research in this particular context is crucial, as call centre workers have been shown to have lower levels of health and more health disruptive behaviours (e.g., Bohle, Willaby, Quinlan, & McNamara, 2011).

Although most studies on affect and health have been focused on negative affect and its impact on illness (e.g., Bakker, Schaufeli, Leiter & Taris, 2008; Seligman & Csikszentmihalyi, 2000), the emergence of positive psychology (Pressman & Cohen, 2005) is challenging this tendency. This emerging positive agenda is crucial, since "well-being and ill-being are largely distinct domains of mental functioning, such that knowledge about the causes, consequences and correlates of one does not extrapolate to the other" (Ryff et al., 2006, p. 86). For example, Wright and Huang (2012) asserted that well-being is evermore emerging as an important research topic given its empirically supported impact on several aspects, including health.

Results from both research lines defend different perspectives. On the one hand, the traditional focus on negative affect proposes that it has greater influence on heart responses. Regarding the occurrence of this relation at work, theoretical models such as the Siegrist model (1996), which differentiates work stress between imbalance (between efforts and rewards) and over commitment, postulates that negative experiences at work influence cardiovascular activity to a greater extent. For example, Vrijkotte, van Doornen and de Geus (2009) found that work stress influence cardiovascular activity, and that such influence is stronger in individuals that experienced an imbalance at work, i.e., high effort and low rewards, which was shown to be the case of call centre operators (e.g., Krause, Burgel & Rempel, 2010). Different, though concurrent, theoretical frameworks consistently found support for the impact of negative emotional experiences for physical health. For example, the Allostatic Load Model (see, e.g., McEwen & Stellas, 1993; McEwen,

2000) describes how the cumulative exposure to stress, and subsequent body stress responses activation, damages the body at different levels over time, with a special focus on cardiovascular health.

On the other hand, a more recent line of research asserts that positive affect also has an important impact on cardiovascular health (e.g., Herring, Burleson, Roberts, & Devine, 2011) and the potential to outshine the influence of negative emotions. It is clear in literature that both affective valences influence cardiovascular health, but whereas heart responses to negative stimuli are claimed to be more rapid and related to the responsive increase of sympathetic nervous system activity, responses to positive stimuli are more long-lasting as they increase total autonomic nervous system power, which has the function of controlling and regulating several visceral functions like heart rate (e.g., Gabella, 2001). This was corroborated by the proposition of the *undoing effect of positive emotions* (Fredrickson & Levenson, 1998), which states that positive emotions experienced after a negative ones buffer the psychological and physiological effects that negative emotions have on individuals.

However, both lines of research lack support or information from real work contexts, and from the experience of natural emotional stimuli that is not (1) artificially induced; (2) caused by multiple external/internal sources that are not linked to social interactions at work. In this sense, we opted to contrast the influence of positive and negative emotional experiences aroused from customer interactions on daily cardiovascular efficiency oscillations. It is important to include temporal aspects when using cardiovascular measures because research has shown that cardiovascular activity fluctuates over time, including at short periods of time (Goldberger, Amaral, Hausdorff, Ivanov, Peng, & Stanley, 2002), making cross-sectional designs inappropriate.

Cardiovascular health is normally accessed with the systolic blood pressure (SBP), the diastolic blood pressure (DBP), or with the pulse pressure, i.e., the difference between the SBP and the DBP. However, as Franklin, Khan, Wong, Larson, and Levy (1999) warned, the use of single measures of cardiovascular health (like SBP and DBP) might yield inaccurate results. As explained by Wright and colleagues (2009), contrarily to the traditional wisdom that assumes that, when individually measured, these values positively correlate with cardiovascular disease, DBP negatively correlates with it (Franklin et al., 2001). This is particularly evident for ageing workers, since as people grow older, DBP tends to decrease or stabilize while SBP tends to increase (a phenomenon called systolic hypertension, see Franklin et al., 1999). Additionally, as Wright and colleagues (2009) argue, there is a major problem with pulse pressure (SBP-

DBP), as its value for a person with a SBP = 200 and a DBP = 160 (40mm) is the same of the one for a person with a SBP = 120 and DBP = 80 (40mm) and obviously does not indicate the same levels of cardiovascular health. Considering also the example of an individual that, although having normal SBP and DBP values, has an extremely high heart rate, the pulse pressure measured alone would not signal cardiovascular readings as problematic. For these reasons, the use of composite cardiovascular measures is more accurate.

In this sense, in the present study we operationalize cardiovascular efficiency with a measure called pulse product, developed by Addis (1922). The scholar found that systolic blood pressure (SBP) and diastolic blood pressure (DBP) measured alone not only produced contradictory results as they did not accurately predict individual efficiency. The scholar found that only the pulse product (which is the difference between SBP and DBP, multiplied by the pulse rate) showed an increase proportionate with increased work and that it was a reliable indicator of workers' energy expenditure, based on the proposition that efficiency is the product of the input (worker physical energy) and the output (see Wright et al., 2009). When the use of cardiovascular resources is inefficient, organizational productivity will sooner or later be unfavourably affected (Wright & Diamond, 2006).

Later on, Lovekin (1930) integrated the pulse product on his studies on human efficiency at work and found it to be a reliable measure for predicting employees' energy expenditure. Mayo (1933) and Roethlisberger and Dickson (1939) corroborated the efficiency of the pulse product in the Hawthorne experiments, concluding that high work outputs and low to moderate pulse product values were a sign of skilled and efficient work (Roethlisberger & Dickson, 1939). The pulse product was also found to be predicted by workers' psychological well-being, increasing for example in situations of distress (Wright et al., 2009). However, to our knowledge, no study explored the influence of affect at work on this measure, with a longitudinal design. As previously mentioned, positive psychology research presented evidence on the outshining power of positive emotions over negative ones, the so called "undoing effect", claimed to have a more long-lasting effect on heart activity, whereas the impact of negative emotions is more immediate and reactive. Because we are exploring the relation between emotions and cardiovascular efficiency at the day level, and not immediately after each event's occurrence, we hypothesize that:

Hypothesis 3a: Positive affect aroused by customer-related events will be a stronger predictor of cardiovascular efficiency than negative affect.

We also aim to explore what discrete affective reactions are more important to cardiovascular efficiency. Evidence has accumulated to show that both valences have independent effects, but we have only a rudimentary understanding of how discrete affective reactions intersect or are independent regarding their effects on health, as very few studies explored their relation in tandem (e.g., Diener & Chan, 2011). The rise of positive psychology was coupled with a burgeoning interest in such relation, with a particular focus on positive emotional states for a healthy functioning. Looking at literature, happiness seems to be the most relevant emotion in predicting cardiovascular efficiency. For example, it was found to influence the duration of cardiovascular reactivity (time to return to baseline levels) after negative emotional arousal; to relate to lower risk of coronary heart disease; to predict longevity, among others (e.g., Davidson, Mostofsky, & Whang, 2010; Koopmans, Geleijnse, Zitman, & Giltay, 2010; Veenhoven, 2008).

Despite the robust evidence hereby presented, it is yet to be investigated if this pattern is the same in the workplace and considering the additional influence of other emotions, since most studies explored the relation happiness-health outcomes focusing on important life events as the sources of happiness (e.g. Dobson, Smith, & Panchana, 2005). Based on the exposed evidence, we hypothesize that:

> *Hypothesis 3b: In comparison to other emotions, happiness will be the strongest predictor of cardiovascular efficiency.*

Method

Data Collection Procedures

We collected data over ten consecutive working days, *in loco*, in a major inbound call centre company where employees answer telephone calls from customers to deal with subjects like billing, products and services. After obtaining permission to conduct the study, we contacted front-line workers by letter to inform them about the study's topic, objectives, method, and of their right to withdraw from the research at any time. Anonymity, confidentiality and privacy were assured to each worker that voluntarily agreed to participate in the study.

At the beginning of the investigation, participants received a stack of one-page forms on which they were asked to record daily critical incidents with customers (good and bad) right after their occurrence and to score the emotions that each event aroused. Participants were asked to hand their completed forms at the end of each working day to the researchers, who were in a private room. When handing the filled diaries at the end of each day, researchers asked participants, for reassurance, if the events were reported right after their

occurrence. The ones that were not were discarded from the study to avoid the influence of memory biases. This daily interaction with participants was also a way of encouraging them to report the events on a daily basis, so that emotions would be more precisely rated and not recalled at the end of the research. Cardiovascular measures were assessed at the beginning and at the end of the working day, in the above-mentioned private room. Two trained researchers measured participants' SBP, DBP and pulse rate. These indicators were assessed using a standard digital Blood Pressure monitor. The measures were taken twice each time, and the average pulse rate, SBP and DBP were used for analysis.

Participants

From the entire department (N = 80) sixty percent agreed to participate. Two individuals withdrew from the study on the first day. Participants were 48 call centre workers (Men = 32%), aged between 22 and 54 years-old (M = 32.11, SD = 7.169). Tenure ranged from six months to 13 years (M = 4.53, SD = 4.27) and 43% of participants had a higher education degree. Main job tasks involved communicating with customers via integrated telephone and computer solutions, solving customers' problems, complaint handling, and billing issues. All participants worked full-time (8-hour shift, Monday to Friday). Prior to the beginning of the study, we asked participants if they had: 1) chronic or present health problems; 2) addictions (e.g., smoking); and 3) health hazardous habits (e.g., binging drinking, casual smoking, and regular consumption of fast-food), as these dimensions could influence the results. All participants assured having none of the above behaviours/health conditions.

According to data provided by the company, on average each worker answered 65 daily calls (SD = 38.59), with an average duration of 2.5 minutes (SD = 1.43).

Instruments and Measures

Event Level

Customers' events and employees' affective reactions. We opted for the diary events method, as it is an effective way to collect data in an organizational context, in its natural environment. This method allows respondents to express "little experiences of everyday life that fill most of our working time and occupy the vast majority of our conscious attention" (Wheeler & Reis, 1991, p. 340), within a small time frame between the occurrence of the phenomenon and its reporting, reducing memory biases (Grandey et al., 2002). We asked participants to report interactions in which customers' behaviours significantly influenced their emotions following the next instruction: "Please, describe in detail an event with a customer that

significantly influenced your emotions, either positively or negatively". Based on the cognitive appraisal theory (Lazarus, 1991), we anticipated that for an event to be noteworthy, or significant, individuals first had to appraise it as positive or negative, beneficial or harmful to their goals and needs. Based on the appraisal of the event's relevance, individuals decided whether it was worthy to report or not (Ohly & Schmitt, 2013).

We also asked participants to rate the emotions aroused by the reported event, and emotions' intensity, using the Scale of Positive and Negative Experience (SPANE, Diener et al. 2009). The SPANE is a 12-item questionnaire used to assess positive (e.g., happy, joyful) and negative (e.g., angry, sad) emotions (six positive and six negative). Respondents rated each emotion on a 5-point scale, from 1 ("not intense at all") to 5 ("extremely intense"). We asked participants to complete the form immediately after the occurrence of the event, so their emotional reactions were still fresh.

Daily Level

Intention to quit. Intention to quit was assessed daily, in the afternoon, with a three-item scale developed by Landau and Hammer (1986). The items, ranging from 1 "strongly disagree" to 5 "strongly agree", were: 'As soon as I can find another job I will leave'; 'I am actively looking for another job'; and 'I am seriously thinking of quitting my job'.

Cardiovascular efficiency. To measure workers' cardiovascular efficiency we used the pulse product, a composite variable that, by assessing DBP, SBP, and heart rate together, is able to provide comprehensive and accurate information about the individuals' organic balance, i.e., how efficient the worker's level of energy expenditure is. The specific formula for its calculus was: pulse rate x [SBP-DBP] x 100. Lovekin (1930) reported pulse product averages ranging from 23 to 41; lower readings are considered as indicative of cardiovascular efficiency and higher readings as indicative of lower efficiency.

To access the extent to which cardiovascular efficiency increased or decreased during the working day, we measured it at the beginning and at the end of each shift and used the difference between both as an indicator of individuals' cardiovascular efficiency. Therefore, a positive result in the difference between pulse product readings in the morning and in the afternoon (e.g., PPmorning = 50; PPafternoon = 38; difference = 12) indicates that efficiency increased.

Note on Collected Data

The reader will note that the N of cardiovascular efficiency is lower (N = 181) than it should be. This discrepancy was due to the fact that not all participants strictly followed the instructions to come to the

researchers' room to measure heart rate and blood pressure at the beginning and at the end of the working

shift. Some participants failed occasionally to come in the beginning of the shift (examples of participants'

justification were related to forgetfulness, arriving late, or "just on time" to start working); or in the

afternoon shift (examples of participants' justification were related to forgetfulness, having to stay longer

(extra-hours) due to excessive workload, or finishing work slightly later than expected and, due to external

commitments, not having time to come to the researcher's room). Whenever we did not get morning and

afternoon measurements from the same participant on the same day, it was not possible to compute daily

cardiovascular efficiency and for this reason such cases were discarded.

Regarding the reported events, we have an individual mean of 5.56 events per participant, which

translates into 6 events on average out of the 10 possible working days. Participants justified not reporting

events every day as not having experienced any type of interaction that was sufficiently strong to cause

emotions that were worthy of reporting. As we mentioned earlier, mean tenure was nearly 5 years. This long

experience dealing with customers has probably promoted the development of coping strategies and

resilience that allowed participants to not experiencing an emotional response to most of customers'

behaviours.

Person Level

Propensity for emotional contagion. We used the Emotional Contagion Scale developed by Doherty

(1997). It is a 15-items self-report scale used to measure susceptibility to mimic five basic emotions (3 items

per emotions): sadness (e.g, 'I get filled with sorrow when people talk about the death of their loved ones'),

fear (e.g., 'Watching the fearful faces of victims on the news makes me try to imagine how they might be

feeling'), anger (e.g., 'It irritates me to be around angry people'), happiness (e.g., 'Being with a happy person

picks me up when I'm feeling down'), and love (e.g., 'I sense my body responding when the one I love

touches me'). Responses range from 1 "Never" to 5 "Always". The scale was applied once, at the beginning

of the study.

Data Analysis and Results

Definition of Categories of Events

Two judges analysed the reports, and subsequently, determined the categories according to the

similarities between them. Data was analysed with Atlas.ti 7 software (Friese, 2013). To guarantee the

trustworthiness and objectivity of the categories that emerged, a third judge, who was unaware of the aims of

the study, was asked to match the incidents with the categories proposed. Cohen's κ was run to determine if there was agreement between the evaluations (Landis & Koch, 1977). There was a substantial agreement between the researchers' judgments: κ = .910, p < .01.

Overall, participants reported a total of 267 customer-related events. Each diarist reported a mean of 5.56 significant events. From these, 169 (63%) were negative, whereas 98 (37%) were positive. The difference between the reporting of negative and positive events was significant (X^2 = 107.87, $p < .01$, df = 1), suggesting an overall negative perception of customer-related work events. Participants also reported a total of 1232 emotions (see Table 1). Negative emotions (N = 676, 55%) were reported more often than positive emotions (N = 556, 45%). This difference was also significant (X^2 = 77.15, $p < .01$, df = 1). Detailed descriptive information of the positive and negative emotions at the event level is provided in Table 1. It is worthy to make some mention to the ICC(1) values. The majority of the variables show high variability at within-person level (i.e., ICC[1] have low values) meaning that the influence of person-level is low (except for the case of intention to quit, that seem to be more stable). This is especially significant in the case of positive emotions, that show the lower ICC(1) values.

Regarding the categories, the judges extracted 13 categories of events (7 negative and 6 positive). A detailed description and examples of each category of behaviours is provided in Table 2. Some of them can be easily related with the categories reported by Kiffin-Pettersern et al. (2012). For example, gratitude here is partially related with 'helping the customer', compliment is analogous to 'recognition for service' or friendliness is equivalent to 'pleasant customer'.

Hypothesis Testing: Artificial Neural Networks

Due the nested structure of the collected data (i.e., events nested in days that, in turn, are nested in participants) a multilevel approach would be necessary. However, there are two problems that represent a barrier to apply it here. First, the measures of discrete emotions are not independent (Mayne & Ramsey, 2001), meaning that we can experience more than one emotion at the same time; this fact would suppose a violation of the independence of measures necessary for the application of classic multilevel analysis based in linear modelling (e.g., HLM). Second, we have different number of observations per each participant in the variables of interest; this introduces problems for the hierarchical regression analysis that does not converge with this kind of dataset. For these reasons, we have preferred to use artificial neural networks (ANNs) that are more flexible to work with this kind of data.

Artificial neural networks (ANNs) are increasingly becoming recognized as a potent tool in customer behaviour and emotions' research (e.g., Briesch & Rajagopal, 2010). They are particularly relevant for our hypotheses because (1) like in principal component analysis, the neural networks form hidden nodes that enable the identification and removal of correlations among variables, allowing for dimensionality reduction, but with the advantage that ANN uses nonlinear algorithms; (2) provide information about the level of the activation of the outputs (emotions, turnover and cardiovascular efficiency, in our case) generated by the predictors; and (3) with sensitivity analysis it is possible to identify the importance of each predictor.

We opted to use Multilayer Perceptron ANNs, one of the most prevalent types of ANN for several reasons: it serves different types of models, it is proficient at modelling complex functions, it is robust in terms of identifying and consequently disregarding irrelevant inputs, and it is flexible in adapting the weights to external changes.

In order to improve the training of the ANNs, the scale dependent variables were rescaled through standardization. For the analyses, the sample was randomly divided in two: 70% assigned for training and 30% allocated for testing. This procedure allows us to track the errors and to prevent over-training (e.g., Karanika-Murray & Cox, 2010). We used batch training because it reduces the total error and it is more accurate to small-medium datasets. With regard to stopping rules, we allowed one additional step (i.e., the repetition of the training method) when error stopped decreasing.

Exploring the Relation between Events and Affective Reactions

To ascertain the pertinence of the extracted event categories, we started by computing the normalized importance of the events for workers' emotional experience. All events, apart from sarcasm, had a normalized importance of 50% or more (see Figure 2), which supports the relevance of the extracted categories for prediction of participants' emotional experience. As we can see in Table 3, the R^2 values for the majority of emotions aroused by the extracted categories of events was substantial, ranging from 0.40 to 0.86, indicating a high explanation power.

The most important neural network connections are shown in Figure 3. We labelled each hidden node according to the nature of its strongest contributors. Accordingly, we name hidden node 1 (HN1) as "aggressive behaviour", hidden node 2 (HN2) as "mistreating behaviour", hidden node 3 (HN3) as "negative behaviour's directed towards the company", and hidden node 4 (HN4) as "positive behaviours". In this structure it is interesting to see how the ANN retains all the negative events and only two of the positive

ones. Moreover, these negative and positive events do not blend among them and generate clearly different kinds of emotional responses in the workers.

Exploring the Moderating Role of Employees' Propensity for Emotional Contagion

We divided the sample in two groups based on individuals' scores on the emotional contagion scale (low *vs.* high propensity for emotional contagion), dividing by the median value. A t-test was conducted to verify if the emotional contagion scores were significantly different across the two groups. There was a significant difference in the scores for the low propensity (M=2.27, SD=.45) and the high propensity (M=2.98, SD=.13) conditions ($t_{(265)}$ = -19.54, p < .001).

We trained two ANNs, one for the high propensity for emotional contagion group (175 observations) and another for the low propensity for emotional contagion group (92 observations). To test hypothesis 1a ("*Those with higher levels of susceptibility for emotional contagion would be influenced by more events in general than individuals with lower levels of susceptibility for emotional contagion*") we computed the relative importance (RI) of each predictor for the two groups. RI is an effect size metric that specifies the importance of a predictor considering all others, providing a description of the weights of all input variables (Lucek & Ott, 1997). A relative importance greater than .10 indicates major contributions, whereas those between .05 and .10 represent moderately, but still important, contributions (e.g., Karanika-Murray & Cox, 2010). As it is reported in Table 4, the high propensity for emotional contagion group was significantly (RI > .05) influenced by approximately all listed events, independently of their valence (nine out of thirteen events). Contrarily, the low propensity for emotional contagion group was only significantly influenced by three out of thirteen events, and all of them were positive. These results provide support for hypothesis 1a ("*Those with higher levels of susceptibility for emotional contagion would be influenced by more events in general than individuals with lower levels of susceptibility for emotional contagion*").

To test for hypothesis 1b ("*Those with higher levels of susceptibility for emotional contagion would experience a more intense affective reaction to events than individuals with lower levels of susceptibility for emotional contagion*"), a new t-test was conducted to compare the intensity of affective experience (considering the average of all 12 discrete emotions) in the high propensity for emotional contagion group and in the low propensity for emotional contagion group. There was not a significant difference in the scores for both groups (high contagion group: M = 1.84, SD = 0.635; low contagion group: M = 1.99 SD = 0.607; $t_{(3192)}$ = -5.241, p > .05). therefore, we found no empirical support for hypothesis 1b.

Exploring the Relation between Affect and Intention to Quit

To test hypothesis 2a ("*Negative affect aroused by customer-related events will positively predict turnover intentions*") we trained an ANN with all 12 discrete emotions as inputs and the intention to quit variable as the output. Architecturally, the intention to quit ANN had a 12-4-1 structure. Error measures yield satisfactory results (MAPE = 0.18, RMSE = 0.6 and CVR = 0.72, p < .01, R^2 = .51). We used Olden's algorithm (see Olden, Joy, & Death, 2004) to define the importance of each input variable, due to its superior performance in evaluating variable importance in terms of magnitude and sign in quantitative data. Figure 4 clearly supports hypothesis 2a ("*Negative affect aroused by customer-related events will positively predict turnover intentions"),* as anger is clearly the most important positive contributor to turnover intentions (Importance = 97.650), supporting hypothesis 2b ("*In comparison to other emotions, anger will be the strongest predictor of turnover intentions*").

Exploring the Relation between Affect and Cardiovascular Efficiency

To test hypothesis 3a, where the objective was to contrast the explanatory power of positive vs negative emotions regarding cardiovascular efficiency daily fluctuations, we trained two ANNs, one with the 6 positive emotions as inputs, and the other with the 6 negative ones. Cardiovascular efficiency (the pulse product) was included in the output layers in both cases. In terms of architecture, both ANNs had a 6-2-1 structure, as no additional interpretative power was obtained by adding more layers. The results for both models indicate that negative emotions exceed positive ones in terms of variance accountability and model fit: (1) negative emotions: MAPE = 0.14, RMSE = 0.8 and CVR = 0.66, p < .01, R^2 = .41; and (2) positive emotions: MAPE = 0.8, RMSE = 89.5 and CVR = 0.42, p < .01, R^2 = .18. This result does not provide support to hypothesis 3a ("*Positive affect aroused by customer-related events will be a stronger predictor of cardiovascular efficiency than negative affect.*"). To test for hypothesis 3b, we trained an ANN with all emotions with Olden's algorithm to determine the most important predictors. The best architecture was a 12-5-1 and results showed a satisfactory predictive power (MAPE = 0.03, RMSE = 0.64, and CVR = .567, p < .01, R^2 = .32). However, there was no support for hypothesis 3b *("In comparison to other emotions, happiness will be the strongest predictor of cardiovascular efficiency"),* since the contribution of negative emotions to cardiovascular efficiency clearly surpassed the influence of positive ones. In particular, the (negative) contributions of "Afraid" and "Negative" alone, the most important input variables, are higher

than the summed contributions of all other emotions together (Afraid = -9550.78; Negative = -3177.81, see Figure 5).

Discussion

The main purpose of this study was to further our knowledge on the antecedents and outcomes of affective experience at work. Overall, this study comprehensively responded to Lindebaum and Jordan's (2012) call for more research on discrete emotions and their relation to (a) varying work contexts (we focused exclusively on inbound call centres), (b) potential beneficiaries on the basis of status (customers *vs* workers), and (c) other individual differences (propensity for emotional contagion). We added to this call by considering the AET's proposition that affect will also influence, over time, affect driven attitudes (turnover intentions). Finally, and trying to study affect influences beyond attitudinal measures, we have also included a physiological measure in our research (cardiovascular efficiency).

We also responded to scholars' calls for the identification of specific events related to particular job tasks and specific work settings (Maybery, 2003) by focusing on events solely related to customer behaviour in a call centre context, from the perspective of workers. This is also aligned with the SIM's theoretical proposition on the pivotal role of social relations for emotional experience. In the context where the study was conducted, both negative events and emotions were reported significantly more often than positive ones, supporting the proposition that in most work scenarios people are becoming ever more unable to treat others in a positive way (e.g., Daw, 2001). At inbound call centres this phenomenon is particularly salient, mainly because of the reasons motivating customers to call (e.g., product failure, bad service, dissatisfaction, among others) and due to the absence of physical contact, which represents a protection from potential reactions to mistreatment. An alternative explanation for this fact is that individuals are naturally more prone to recall negative events than positive ones, the so-called *asymmetry effect* of emotions (e.g., Dasborough, 2006) referring to humans' natural inclination to recall affective events that aroused negative emotional responses. This line of research, inspired by the pioneering work of Peeter (2002), suggests that people are more focused on analysing and solving negative occurrences in order to avoid negative outcomes than to foster positive ones. This attention bias is also related to evolutionary aspects, since humans (and other animals) inherently had to put extra focus on negative events to protect their wellbeing and, ultimately, their lives (e.g., Pratto & John, 1991).

Results from sensitivity analysis showed that the R^2 for affective responses to customers' behaviour was high, indicating that workers' dealing with customers are not emotionally impermeable to their behaviour. We aimed to advance knowledge on the individual characteristics that promote/inhibit emotional experience caused by daily events at work. In this sense, we integrated for the first time in the AET worker's propensity for emotional contagion as a moderator in the relation events-emotions. More specifically, we hypothesized that "*those with higher levels of susceptibility for emotional contagion would be influenced by more events in general than individuals with lower levels of susceptibility for emotional contagion*" (H1a). Sensitivity analysis provided empirical support for H1a. Although not hypothesized, we also found that individuals with lower propensity for emotional contagion were only influenced by positive events. This result suggests that these individuals have the capacity to foresee the impact of customer behaviours, permeating their influence when such impact is negative. This filtering ability is also extended to positive events. For example, low contagion workers never reported as significant those events that were possibly perceived as too personal (e.g., "familiarity" or "laugh together"). One explanation for this phenomenon is that such events do not fit in the formal nature of customer interaction and may be detrimental for performance targets (for example, by delaying the duration of the conversation). As such, this group appears to be more rational and able to perform in a more self-regulated manner, disregarding what is negative and taking advantage of the positives, but only if they fit the established organizational moulds.

We also found that the intensity of emotions experienced by both groups had no significant difference (thus rejecting H1b: "*Those with higher levels of susceptibility for emotional contagion would experience a more intense affective reaction to events than individuals with lower levels of susceptibility for emotional contagion*"). This result indicates that propensity for emotional contagion determines the extent to which an individual is vulnerable to mimic and converge with the emotions of others, however it does not determine the intensity in which emotions are experienced, supporting the afferent feedback hypothesis that in biological and involuntary by nature. To our knowledge there is no empirical investigation comparing the intensity of the emotional experience in people with low vs high emotional contagion. Our results open doors for an apparently interesting avenue of research.

Given the strategic importance of call centre workers emotional well-being and the high costs for organizations when these workers leave or suffer from health conditions, we explored the impact of affective reactions elicited by customer interactions on turnover intentions and cardiovascular efficiency. Regarding

turnover intentions, we found that negative affect in general, and anger in particular, were robust predictors of intention to quit. These results corroborated both H2a (*"Negative emotions aroused by customer-related events will significantly predict turnover intentions"*) and H2b *("In comparison to other emotions, "anger" will be the strongest predictor of turnover").* As it is depicted in Figure 3, anger was mostly caused by interactions where the employee perceived aggressive or mistreating behaviour from customers. The subsequent intention to quit, as a motivation to withdraw from the scenario where the aggression took place (in the workplace), reveals a basic desire for self-protection and preservation of resources (e.g., Baumeister, Muraven, & Tice, 2000). Harlos (2010) proposed that when dealing with unpleasant customers, workers' might engage in a hostile attribution bias. Such bias was shown to be related to anger, which in said situations acts as a protection mechanism in face of the prospective danger or maltreatment behind the perceived hostility. It would be worthy to study in the future what other processes and attributions are involved in the relation between events and anger.

Regarding cardiovascular efficiency, we did not find support for H3a ("*Positive affect aroused by customer-related events will positively predict cardiovascular efficiency")* neither for H3b (*Happiness will be the strongest predictor of cardiovascular efficiency").* Contrary to the propositions of positive psychology, i.e., that in the long run positive emotions outshine the effect of negative ones, our results were clear: when explored at a daily-basis, negative emotions explain more than the double of variance in cardiovascular efficiency (41%) than positive ones (18%). One explanation for our results is that most studies supporting the superior effect of positive emotions were conducted in laboratory contexts, in controlled environments and where the inducement of positive and negative emotions was planned to produce an equivalent emotional experience (in terms of intensity) on individuals. In our context, the effect of both valences of emotions was assessed at the day-level, meaning that we did not study the confluence of two isolated and equivalent emotional episodes but instead the cumulative frequency of a series of emotional experiences occurring in a natural setting. In this case, the frequency of negative events and the experience of negative emotions appeared significantly more often than positive ones (negative events: 169 (63%), positive events = 98 (37%), X^2 = 107.87, $p < .01$, df = 1; negative emotions = 676 (55%), positive emotions = 556 (45%), X^2 = 77.15, $p < .01$, df = 1), providing complementary information on the role of affect to cardiovascular efficiency from the perspective of a real work context, where negative stimuli appears more often and is not similar in terms of intensity. This is in line in line with the AET's propositions that (1) the

occurrence and emotional consequences of daily events are highly dependent on specific work features, and (2) they are markedly stronger in strained contexts (Weiss & Cropanzano, 1996). Moreover, there is empirical evidence supporting that negative stimuli has more influence on information processing (e.g., Cacioppo & Gardner, 1999; Carretié, Mercado, Tapia & Hinojosa, 2001) and that it promotes a negativity bias in attention allocation (Smith, Cacioppo, Larsen & Chartrand, 2003), having therefore a stronger probability to influence individuals. Early investigations on this domain reported that people are automatically drawn to negative stimuli and are faster and more efficient to identify it (Öhman, Lundqvist, & Esteves, 2001). In this sense, our results are relevant because they provide support about the influence of affect (specifically negative affect) on workers' subjective (i.e. intention to quit) and objective responses to it (i.e. cardiovascular efficiency).

Furthermore, we found no support to our Hypothesis 3b *(In comparison to other emotions, happiness will be the strongest predictor of cardiovascular efficiency),* which was formulated based on the positive psychology agenda. We found instead that in this specific context feeling fear was the most important predictor of cardiovascular efficiency, and that its relation to it was negative. We propose two explanations for this result: a physiological perspective, and a psychological one. Physiologically, fear is depicted as a response to immediate stressors or threats, giving rise to relevant physiological alterations aimed at preparing the body for action in face of a threatening situation (as shown in Fig. 3, aggressive customer behaviour was the most important predictor of fear), like increasing blood pressure and heart rate (e.g., Kish-Gephart, Detert, Treviño & Edmondson, 2009). As described by Öhman and Mineka (2001), humans have a *fear module* that is evolutionary. Humans developed a direct connection between the thalamus and the amygdala that allows an automatic and fast processing of threat signals. When sensory information detects these threat cues, the amygdala instantaneously prepares the body for action with intense physiological changes (e.g., Kish-Gephart et al., 2009).

Psychologically, fear can also be an unconsciously and associative reaction between a present stimulus and traumatic previous ones. As proposed by Kish-Gephart and colleagues (2009, p. 169) "distal experiences (…) carry over and influence present-day interactions with organizational authority figures". Because customers occupy a higher place in the organizational stakeholders' network, we can also consider the associative influence that fear from past negative interactions with customers may have on call centre agents. Additionally to the influence of past experiences, we can also infer the influence of the fear of the

future, or consequences from customer-related events. More specifically, negative events may instigate fear related with the uncertainty of future outcomes (e.g. customers' complaints about the employee and job loss). Research has also shown that fear-related cognition (like worrying, rumination, and anticipatory stress) have a dominant influence on psychophysiological alterations, which are related to the persistent stimulation of the cognitive representation of mental stressors (Brosschot, Gerin, & Thayer, 2006) and a growing number of scholars are coming to agree that these states are stronger contributors to cardiovascular efficiency and stress responses (e.g., Roest, Martens, Jonge, & Denollet, 2010).

Main Theoretical Contributions

Theoretically, the results of this study contribute to the AET, the SIM and the emotional contagion theories by providing specific customer interaction-related categories of daily events, from a particular work context (call centre) and type of social relation (interaction with customers), and by providing support for contagion levels as moderating the relationship events-affective reactions. Moreover, we explored the predictive role of discrete emotions in two important outcomes for the service industry (turnover and health), which is also tightly related to the practical applications of this research. Only few investigations explored the AET model comprehensively, as most studies focused on specific relations at a time.

Our results are pioneer on providing information on affect on turnover. We empirically supported that it can be directly predicted by discrete emotions, and that there is a process comprised by the affective responses aroused by social-interactions that are proximal causes of turnover intentions. Moreover, to our knowledge this was the first study to investigate how this very same process influence cardiovascular efficiency. Our results corroborate previous laboratory and ambulatory investigations by showing that emotions are indeed a strong predictor of cardiovascular fluctuations. We added to existing knowledge by providing results from a really work context and by disclosing what type of events produce the emotions that are more important to cardiovascular fluctuations. We also found no support for the *undoing effect of positive emotions* (Fredrickson & Levenson, 1998) when studying the cumulative effect of emotions on cardiovascular activity. Our results suggest that this proposition may be only supported when emotions are induced in a controlled setting with similar intensity. However, in real work scenarios where both positive and negative emotions occur indiscriminately and with unbalanced intensity, it seems that negative emotions are markedly stronger in influencing cardiovascular efficiency. Additionally, we added to existing knowledge on the pulse product, as this was the first study to relate it with affective experience. As we

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mentioned in the description of this measure, it has been classically correlated with measures of performance and energy expenditure and lately with psychological states.

Moreover, this is one of the few studies that tested the affective events theory model longitudinally. Although the importance of time is one of the foundations of this theory, most studies are conducted with cross-sectional designs. Also, we consider the use of nonlinear analyses as an important contributor to our results' robustness and validity. The use of said methods in particularly relevant for the study of emotions, given their nonlinear nature which was theoretically justified and empirically supported.

Main Practical Contributions

Our results contribute for the implementation of interventions aimed at improving the wellbeing of call centre agents: events categorization may guide managers to design appropriate training (e.g., role-play) as a tool to prepare workers to deal with said events. Results on the importance of these events for workers emotional experience suggests that current training strategies targeted at changing workers' outward expressions of affect do not suffice, as the internal emotional experience has important consequences for judgment driven behaviours and physiological responses. Literature suggests that changing internal emotional experience is important, and there are several ways to achieve it, including (1) empowering workers to reduce the emotional impact of events on their affective experience with tactics such as reappraisal techniques (see, e.g., Lee & Ok, 2012); and (2) autonomy, assertiveness and boundaries setting regarding customer dysfunctional behaviour (e.g. Prof & Yagil, 2007). Companies should also keep records of customers' deviant behaviour and consequent impacts, for example, with focus groups, individual interviews or even with questionnaires. This would allow for the identification of events and respective consequences for workers' welfare. Subsequently, techniques like data mining and pattern recognition could be implemented to identify and analyse trends and patterns of interaction dynamics that could generate important insights to feed into organizational training strategies.

Regarding emotional contagion, time to recover after a dysfunctional interaction could help employees to recuperate and avoid possible emotional spill-overs to future conversations. In addition, encouraging employees to "switch-off" from work in non-work time was shown to promote recovery from job stressors and to reduce emotional exhaustion (Sonnentag, Kuttler, & Fritz, 2010). We also suggest that the emotional contagion scale could be a useful selection tool for this type of work. More specifically, employees with lower propensity for emotional contagion could be more suitable for job types where

negative interactions are more preeminent, as our results clearly supported that this group was mostly influenced by positive events, whereas those with high propensity were influenced by nearly all events regardless of their valence.

Concerning the deleterious impact of anger on turnover intentions, previous research suggests that supportive social relationships buffer the negative effects of anger (Greenglass, 1987). In this sense, managers could implement actions to increase employee quality of life at work through meaningful relations, for example with team building exercises or with strategies related to the *satisfying interpersonal relationships* dimension).

Regarding the important influence of fear on workers' health, it is imperative that managers develop and implement strategies to help workers dealing and overcoming this emotion. Promoting psychological safety could bring fruitful consequences, both at the individual and at the team level, as some authors suggest that this psychological asset can be transmitted from one member to another via social contagion (Soares & Lopes, 2014). Increasing perceptions of social support are also important in job types like call centres where workers perform in a lonely manner the vast majority of time. Strategies to do so could include longer breaks, team building exercises, managerial support, and employees' involvement practices.

Limitations and Future Research

Our study is bounded by limitations that, in turn, indicate potential fruitful avenues for research. The context where the study was conducted (call centre) limits the generalization of the results to other industries. Its idiosyncrasies, like rapid duration of interactions and lack of visual contact, are far from universal. Future studies could replicate this research in other settings and even in a laboratory in order to (1) isolate the parameters of interest to better control the potential influence of confounding variables, and (2) to assess the influence of emotions on outcomes during and right after the event. On the other hand, given that we conducted this research *in loco*, during working times, we experienced some missing data due to some participants' impossibility to come to the researchers' room and provide the measures of interest all days, twice a day (e.g., physiological measures). This was a risk we accepted from the beginning, provided the quality of the data we could obtain in assessing said measures in a real work context. A way future investigations could overcome this limitations would be to measure cardiovascular activity through a continuous ambulatory assessment. Moreover, a recent line of research is coming to agree that the relation between emotions and physiological responses might be mediated by the activation of multiple sub-regions

of the brain that have different relationships with physiological reactivity and regulation (e.g., Waugh, Lindquist, Noll, Fredrickson, & Taylor, 2009). To explore this mediation process could open doors to our knowledge and understanding on the path through which emotions influence physiology.

Furthermore, this research was conducted in a highly stressful work environment, where emotions flow and interchange at a rate that is uncommon in other work contexts. Participants' ability to differentiate and identify the specific emotions and intensity might have been biased and influenced by many factors like the emotions that linger from previous calls. Future research could replicate this study in a different scenario, or with a different procedure by controlling, e.g., for how many and what type of interactions occurred previously to the ones reported. Also, controlling for individuals' general positive/negative affect could have provided important information on how distinct dispositions influence the way a person responds to events.

Finally, the research design does not allow studying possible reverse causality between affect and events. We mean, an initial affective state (i.e. mood) may also influence in the way an event is interpreted and, in consequence, influence the emotions generated by said event, probably in coherence with the previous affective state (e.g., Forgas, 1995). Using an experimental design would be useful for this purpose. Another way to do it would be including measures of general affectivity, like the PANAS (Watson & Clark, 1994), to measure mood at the beginning of the day and using it as a control variable in the relationship between events and emotions.

Conclusions

We explored the influence of specific customer-related events on workers' emotions, through the moderating role of emotional contagion, and found that these emotions had the potential to influence turnover intentions and cardiovascular efficiency. For service employees, the exposure to customers' emotional displays and its subsequent influence on their own emotional lives is almost inevitable. Perhaps training strategies could be developed to lower workers' propensity for emotional contagion in order to alleviate the impact of customer behaviour on their emotions. However, the fundamental conclusion of our study is that the impact of customer behaviour on workers does not end when they hung up the phone. In fact, customers influence emotions, attitudes towards the job, and health. Consequently, organizations should foster positive interactions and dismiss dysfunctional customers. Workers' levels of anger and fear should also be closely monitored and programs to promote positive emotions ought to be tailored. Furthermore,

customer-service work should be presented with a paradigm shift through the implementation of a new

culture of employee welfare that does not allow mistreatment from customers and encourages positive ones.

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Table 1: *Descriptive analysis of the variables of interest.*

Level	Variable	N	*M*	*SD*	α	ICC1

Event level	Positive feelings	267	6.58	9.24	.98	.04
	Negative feelings	267	6.98	7.08	.90	.31
	Joyful	267	1.05	1.53	NA	.03
	Good	267	1.22	1.69	NA	.05
	Pleasant	267	1.24	1.71	NA	.03
	Happy	267	.90	1.48	NA	.05
	Contented	267	.99	1.54	NA	.06
	Positive	267	1.17	1.68	NA	.06
	Angry	267	1.27	1.53	NA	.22
	Bad	267	1.45	1.47	NA	.23
	Unpleasant	267	1.71	1.70	NA	.19
	Sad	267	.64	1.23	NA	.44
	Afraid	267	.52	1.15	NA	.45
	Negative	267	1.39	1.48	NA	.26
Daily level	Intention to quit	261	2.63	1.26	.85	.83
	Pulse product morning	234	55.98	30.88	NA	.38
	Pulse product afternoon	182	34.56	9.21	NA	.41
	Cardiovascular efficiency	181	-.07	11.00	NA	.22
Person level	Propensity for emotional contagion	48	3.66	.63	.90	NA

Note: Discrete emotions means were obtained from the average intensity across all reported events. Positive and negative feeling were obtained by the sum of all positive or negatives discrete emotions. NA = not applicable.

Table 2: *Description and examples of categories of customer behaviours.*

	Behaviour	Description	Example
Positive events	Gratitude	Being thanked or receiving recognition for the service provided	"The client was not very familiar with IT, so it took me quite a while to explain how to access and register on our website. However, in the end he thanked me so effusively that I felt really pleased and appreciated. He really valued my time, work and dedication"
	Compliment	Being praised by customers for the service provided	"(…) and then she (the customer) praised my service saying I was very friendly and attentive. That made me feel good, for a change"
	Politeness	Behaviour from customers that involved socially established and well-accepted conducts like saying please and thank you, speaking with a pleasant tone and using kind words	"Despite his complaint, he (the customer) was always very polite, and in the end even apologized for his outburst. That is not very common, but made me feel positive"
	Friendliness	Behaviour by customers that included being particularly personable and sympathetic, given the context of the interaction	"The client asked me about an amount that was incorrectly charged. Instead of being an upset customer, he accepted the procedures and justifications and was extremely friendly and cordial. I felt relaxed and calm"
	Familiarity	The interaction with customers where employees felt more like family or long-time friends	"During the call she (the customer) continually called me 'darling' and 'sweety', like my grandma used to. I felt cherished, appreciated and more affectionate with my colleagues and other customers". (This particular report illustrates how emotions are contagious and can even spillover to other relations)
	Laugh together	Laughter is one of the contextual clues relevant to identifying the existence of humour. Described as having affiliative ends, to aid the building and sustainability of relationships. It was said to increase the experience of positive emotions and to bring the employee and customer closer by creating a connection and establishing rapport	"The client's data was so outdated that he (the customer) started laughing a lot, it was so contagious I could not help but laugh as well. Oh dear..."

Negative events	Complaints	Complaints directly related to service or product failures where the customer was usually right, although in some rare cases customers complained about faux-failures or situations that were actually in accordance with the company's policies and procedures	"He was so frustrated that he wanted to make a formal complaint. I understand and can totally relate to his feelings, but there was nothing I could do to accelerate the process"
	Does not accept explanations/justifications	Defined by rigidity of thought. Refers to customers that, faced with opposing points of view, wholeheartedly believed they were right and the employees were wrong, leaving no space for dialogue or for listening to further explanations/justifications. Employees viewed this as rude, abusive and even psychologically violent	"She (the customer) was stubborn and insistent. We sent her several notifications but she simply did not accept our procedures. I was tired of explaining and she just didn't care"
	Disconnects call abruptly	Characterized by our sample as one of the rudest forms of insult. It encompassed customers' interrupting the interaction without any previous notice, by simply hanging up the telephone	"The client was very inflexible about the procedure. He was shouting and then hung up the phone while I was speaking. I was truly irritated"
	Asks to speak with supervisor	Customers often finished the communication with employees by asking to speak with a supervisor, which was perceived as abusive, rude, humiliating and offensive	"It was as if he (the customer) thought I didn't have the capability or mental faculties to sort the problems myself"
	Aggressive behaviour/tone of voice	Includes behaviours that were perceived as hostile and violent by the employee, because of the customer's vocabulary or the tone of voice (rapid and loud). It was often accompanied by the absence of congruency in the discourse and shouting	"The client was very angry with our website's poor functioning. I helped him in the process but he was mad and started hitting his computer, screaming and swearing. I was afraid, even though we were just talking on the phone"
	Offending behaviour	Encompasses customers' behaviours and attitudes that were viewed and felt as offensive by employees since they normally included personal offenses, cursing and swearing. It involved a type of customer conduct that expressed an extreme lack of self-control and respect for the employee	"He was really rude and started insulting me and my family. I wish I could insult him back"
	Sarcasm	Represented by reports of customers answering in an ironic, sarcastic way. Customers used sarcastic behaviours to verbally punish the employee due to failures in the service or products. Employees confessed to feeling diminished when this behaviour occurred, especially because they are not allowed to defend themselves	"She (the customer) contacted us to complain about debits made against her account. I was explaining but she refused to listen to me and was sarcastic, saying I was the brightest person in the world but she was being sarcastic. That really hits me, I'm just doing my job"

Table 3: *R^2 of workers emotions elicited by customer-related events.*

Affective reactions	R^2
Good	0,86
Pleasant	0,85
Positive	0,84
Joyful	0,83
Unpleasant	0,76
Bad	0,74
Negative	0,71
Sad	0,45
Afraid	0,40

Note: Emotions 'happy', 'contented' and 'angry' do not appear in this table because their R^2 values were non-significant.

Table 4: *Importance of input variables for two groups depending of their emotional contagion scores.*

Customer behaviour	High propensity for emotional contagion		Low propensity for emotional contagion	
	Relative Importance	Normalized Importance	Relative Importance	Relative Importance
Gratitude	0,103	88,80%	0,195	98,00%
Compliment	0,085	73,20%	0,199	100,00%
Politeness	0,116	100,00%	0,087	43,60%
Friendliness	0,115	99,40%	0,182	91,60%
Familiarity	0,002	1,90%	NA	NA
Laugh together	0,115	99,50%	NA	NA
Complaints	0,096	82,70%	0,050	25,30%
Does not accept explanations/justifications	0,095	81,80%	0,046	23,00%
Disconnects call abruptly	0,024	20,30%	0,035	17,60%
Asks to speak with supervisor	0,043	37,40%	0,087	43,90%
Aggressive behaviour/tone of voice	0,080	69,10%	0,068	34,10%
Offending behaviour	0,078	67,50%	0,051	25,60%
Sarcasm	0,048	41,20%	NA	NA

Note: NA means that the workers did not report this kind of events.

Figure 1: Theoretical model
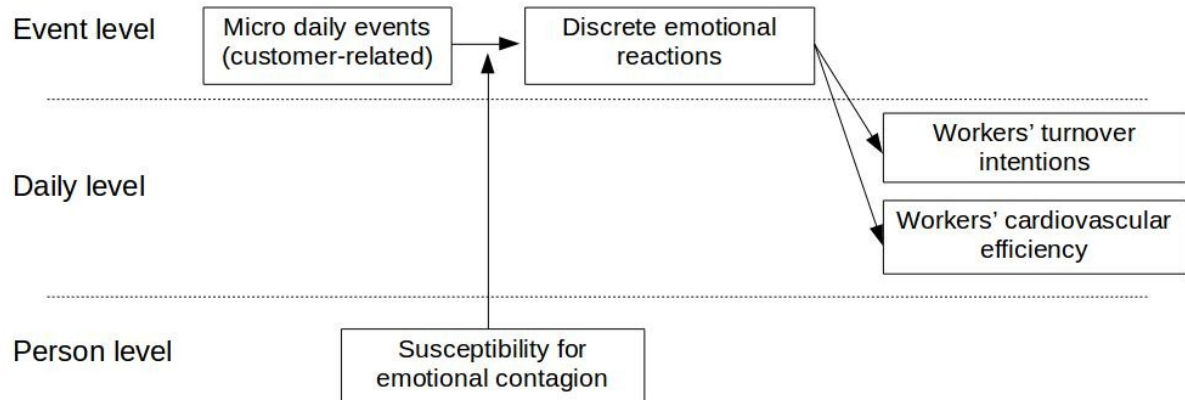
Figure 2: Relative importance of the events for the affective experience.
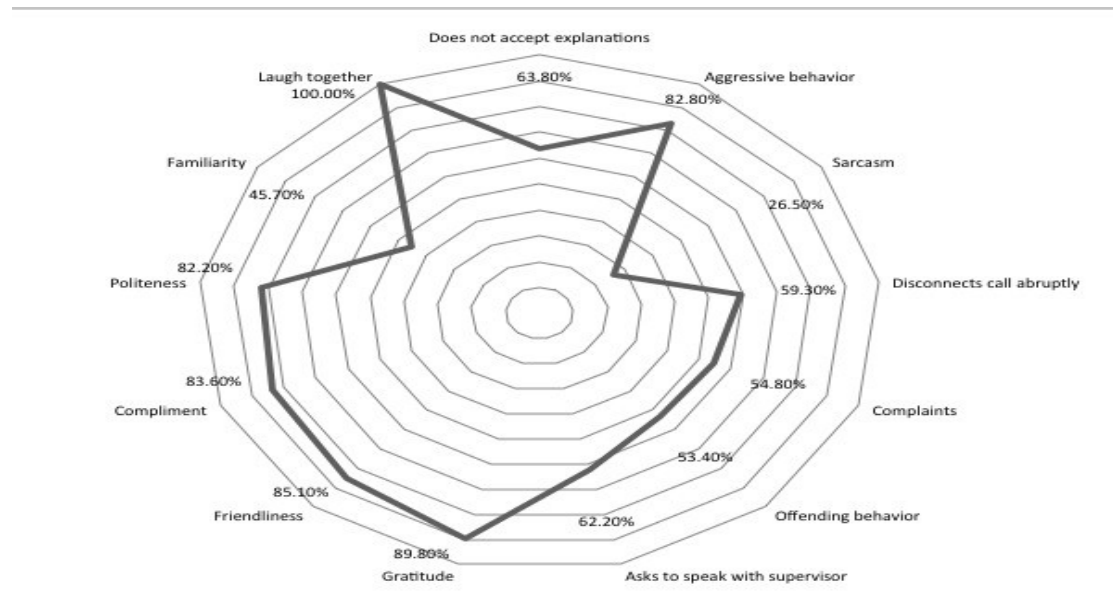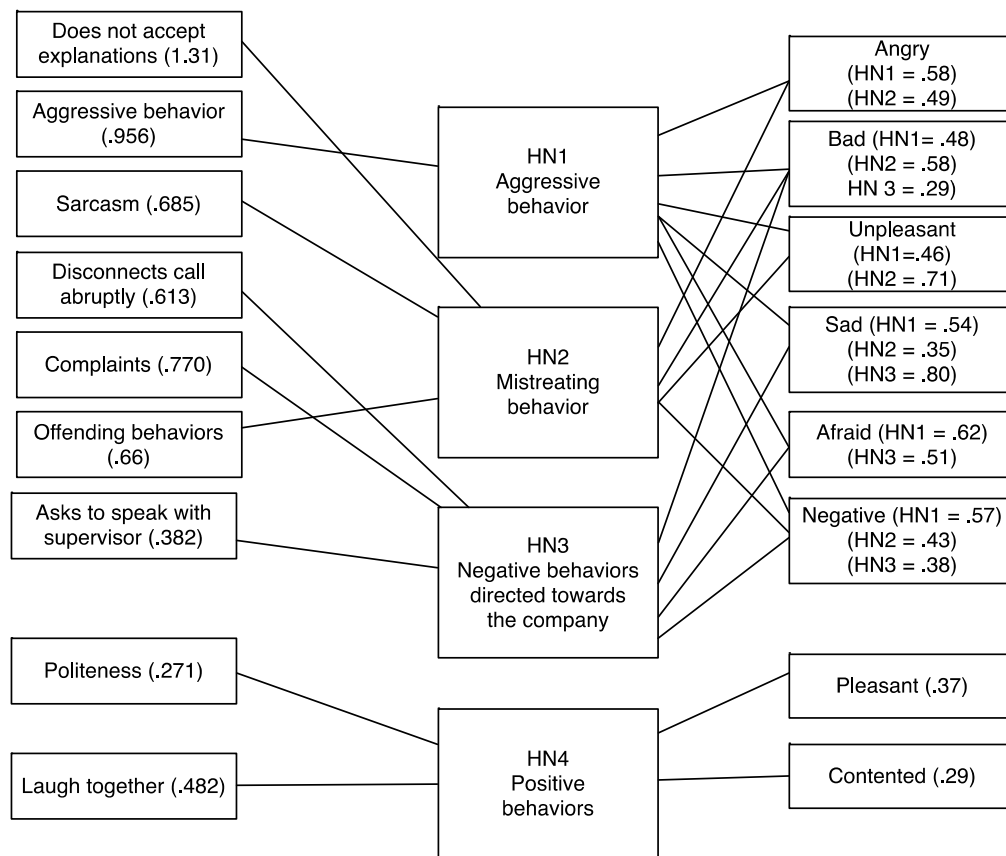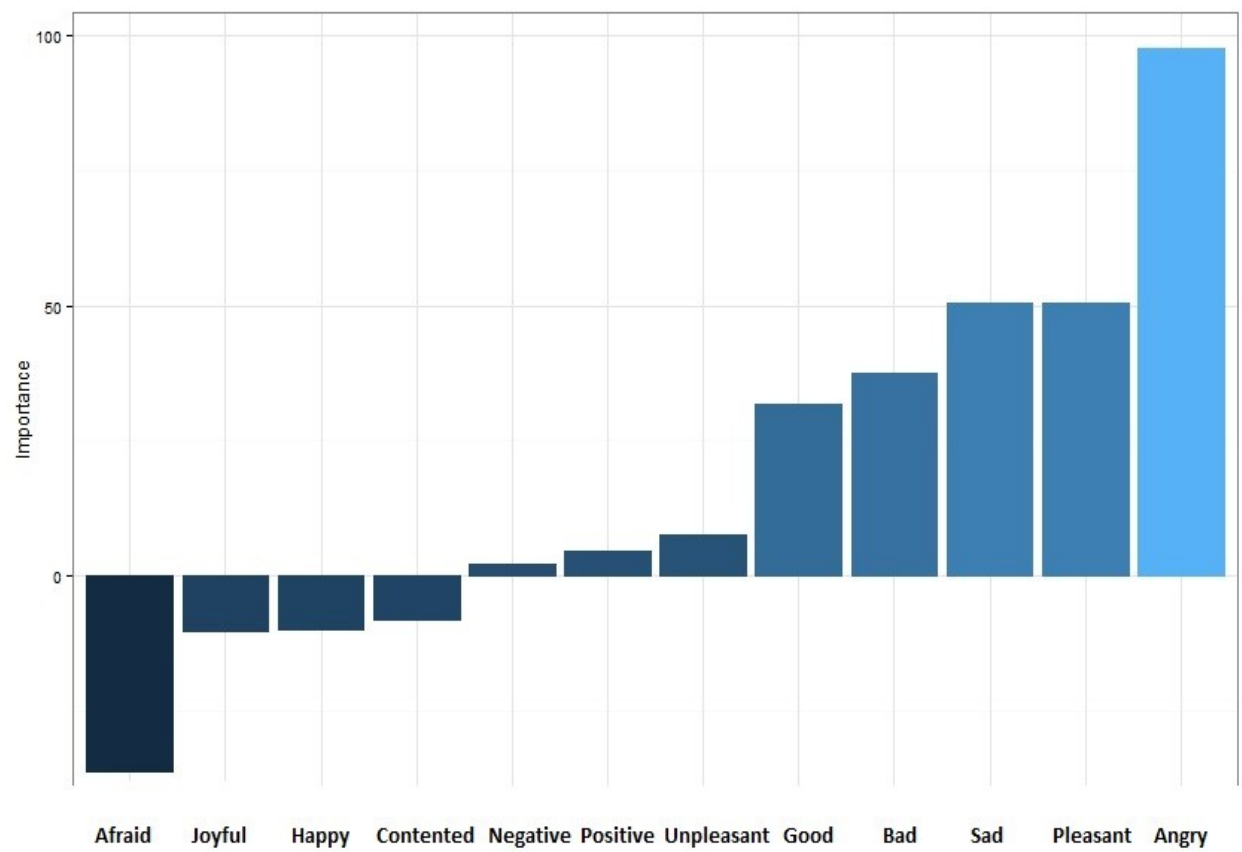
Figure 3: Nodes weights- connections among micro daily events and affective responses.

Figure 4: Olden's algorithm for the RI of emotion to intention to quit.

Figure 5: Olden's algorithm for the RI of emotion to cardiovascular efficiency.