

# EMAIL STRESS: TOWARDS A NEW UNDERSTANDING OF ITS CAUSES AND IMPACTS

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## **Abstract:**

Email is a source of ambivalence for its users, who report feeling divided between the opportunities for productivity gains it offers and threats of overload it poses. This conceptual article seeks to shed light on how email use (for both receiving and sending correspondence) generates perceptions of both threat (stress or distress) and challenge (eustress). It summarizes the main ideas of previous research in a transactional model of email stress distinguishing the experiences of senders from those of receivers and, in so doing, opens new avenues for future empirical research and for more stimulating and less negative use of this communication tool.

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**Keywords:** Email, electronic mail, technostress, overload, hyperconnection.

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Torn between recognition of the performance gains from email correspondence (Sumecki et al., 2011) and frustration with it (Dabbish & Kraut, 2006), between the autonomy enabled by its asynchronicity and the permanent control to which it subjects users across time and space (Mazmanian et al., 2013), email<sup>1</sup> users both love and hate this communication tool (Barley et al., 2011). Cited as a "source and symbol of stress" (Barley et al., 2011), email is constantly threatened with replacement by other tools deemed more relevant (Bertin et al., 2020; Pillet & Carillo, 2016). Nevertheless, it has resisted obsolescence and today monopolizes hours of daily work and almost a third of our virtual communication time (Barley et al., 2011; Dabbish & Kraut, 2006; Dietzen, 2017). It represents an increasingly inescapable reality, despite the development of social networks and collaborative platforms (Bertin et al., 2020).

The statements above testify to email users' ambivalence, i.e., their simultaneously positive and negative evaluations of the tool that produce contradictory emotions in a sort of love-hate relationship (Qahri-Saremi & Turel, 2020). This conceptual article aims to explain this ambivalence and propose an alternative model opening up multiple research perspectives (de Corbière et al., 2021). Its origins lie in the observation that most articles on email stress consider only the stress arising from *receiving* emails (e.g., from overload, interruptions) but rarely mention the stress that might emerge from *sending* them (e.g., Derks & Bakker, 2010; Friedman & Currall, 2003). However, approximately one-third of individuals' email volume is composed of sent messages, while two-thirds of it corresponds to received messages (Dabbish & Kraut, 2006),<sup>2</sup> with a significant proportion of usage time spent writing and replying to messages (Barley et al., 2011). Email is a tool that enables a wide variety of organizational communication genres because of its versatility, asynchronicity and editorial possibilities (Ducheneaut & Watts, 2005; Yates & Orlikowski, 1992). Introducing this dual-faceted understanding of email stress (from both receiving and sending messages) could enable us to explore in a new light not only these genres but also the ambivalence users feel in the face of both the threats and the opportunities offered by this durable communication tool. Based on this observation and an interpretation of the main streams of the literature,<sup>3</sup> this conceptual article asks: **Can distinguishing between sending and receiving emails explain the ambivalent character of email stress?**

This research question invites us to revisit the literature with an eye to the fundamental distinction between sending and receiving messages and to identify

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<sup>1</sup> Also called electronic mail or e-mail.

<sup>2</sup> The fact that more emails are received than sent arises from the sending of messages to multiple receivers. One email sent often corresponds to several emails received.

<sup>3</sup> This interpretation is based in particular on literature reviews about the different uses of email (Ducheneaut & Watts, 2005) and the resulting tasks (Russell et al., 2023), communication problems (Byron, 2008) and conflicts (Taylor et al., 2008). French-language works were collected through a meta-analysis (Tahri & Fallery, 2010) and additional queries on Cairn. Finally, a literature review on the broader phenomenon of technostress (Tarafdar et al., 2019) was conducted to provide a conceptual link to the email literature.

ways of explaining the ambivalence provoked by email stress with a new guiding theory. For now, this endeavour seems unamenable to an empirical approach, as it invites us to rethink empirically established notions such as email overload (Dabbish & Kraut, 2006) (overload for whom and how?) and hyperconnection (Mazmanian et al., 2013) (of the sender differently from the receiver?). Nor does my question lend itself to a systematic literature review or meta-analysis, as I seek not to synthesize and categorize the literature on email (Russell et al., 2023; Tahri & Fallery, 2010) but to investigate themes so far understudied. This project is therefore conceptual in nature and based on generating theory from the main literature streams (de Corbière et al., 2021) and operationalizing it through propositions with an empirical aim (Cornelissen et al., 2021).

This article essentially belongs to the literature on email use (Addas & Pinsonneault, 2018; Barley et al., 2011; Byron, 2008; Ducheneaut & Watts, 2005; Russell et al., 2023; Tahri & Fallery, 2010). This literature, developed over the last 25 years (Russell et al., 2023), will be revisited through the prism of the distinction between sending and receiving emails. Before I proceed with this analysis and the resulting conceptualization, certain concepts central to this article need to be defined. First, the notion of *email stress* is conceptualized in this article as users' appraisal of and reaction to email as a potential source of threat (stress or distress) or opportunity (eustress). This definition is deliberately modelled on that of technostress (Tarafdar et al., 2019), itself inspired by that of stress (Cooper et al., 2001; Lazarus & Folkman, 1984). Indeed, ambivalence between perceptions of threat and opportunity is not unique to email. Any situation (regardless of whether it relates to information systems) can activate such ambivalence and thus invite reactions (Qahri-Saremi & Turel, 2020). These reactions correspond to *coping* strategies, defined as cognitive and behavioural efforts constantly deployed to cope with external and/or internal demands assessed as exhausting or exceeding the individual's resources (Lazarus & Folkman, 1984, p. 141). Threat appraisals trigger a process of stress qualified as *distress*, in which coping strategies are deployed to avoid this threat. Opportunity appraisals trigger a process termed *eustress*, in which coping strategies are instead deployed to seize the opportunity (Lazarus & Folkman, 1984; Tarafdar et al., 2019). Eustress continues to fall under the more global phenomenon of stress in that it concerns opportunities requiring effort and reflection to be seized (Lazarus & Folkman, 1984; Tarafdar et al., 2019). In the context of technostress, for example, users may seek to use generative AI to gain in productivity, but this opportunity requires devoting time to it, stepping out of one's comfort zone and therefore putting oneself in difficulty (strategies also applied to cope with threats).

The definition of email stress proposed here is therefore informed by the transactional view of stress, according to which stress is not a characteristic inherent to the individual but rather the result of a process of back-and-forth between the individual and her environment (Lazarus & Folkman, 1984). Other conceptualizations of stress include stress-as-stimulus (where stress is taken as an independent variable that exerts pressure on the individual) and stress-as-response (where stress is a dependent variable that responds to a threatening stimulus)

(Cooper et al., 2001). Stress is the subject of numerous theoretical models, such as the transactional model mentioned above (Lazarus & Folkman, 1984), the person–environment fit model (in which stress arises from a mismatch between demands and skills or desires), the cybernetic model (in which stress arises from the individual moving away from her comfort zone), and the demand-control model (in which stress arises from demands exceeding capacity) (Cooper et al., 2001). This article draws on the transactional model given its potential to explore stress in relation not only to threats (stress or distress) but also to opportunities (eustress) and to study responses to these threats and opportunities, i.e., coping strategies (Lazarus & Folkman, 1984). Table 1 summarizes the various elements discussed in this article.

<b>Term</b>	<b>Definitions</b>	<b>Examples of themes</b>
<b>Email</b>	A communication tool for sending and receiving written messages electronically and asynchronously to one or more receivers. A message entered, sent or consulted using this tool (inspired by the <i>Larousse</i> dictionary).	Subject, content, date and place of sending and receiving.
<b>Sender</b>	The user writing and sending the email to one or more receivers (Byron, 2008).	Response expectations, hierarchical level...
<b>Receiver</b>	The user receiving and processing emails (Byron, 2008).	Reactivity, email management...
<b>Email stress</b>	Users' appraisal of email as a potential source of threat (stress or distress) or opportunity (eustress) and corresponding reaction (coping).	Email overload, interruptions, invasion, dependency, productivity...

**Table 1. Definitions of terms in this article**

The article is structured as follows. In the first part, I analyse the perceptions generated by the receipt of emails and find that they are predominantly negative (e.g., related to concerns about overload, interruptions). In the second part, I extend this analysis to perceptions generated by the sending of emails and see that they are mainly positive (e.g., related to productivity, task delegation). In the third part, I establish a model to account for this literature and present some proposals. In the fourth and final part, I discuss new research perspectives and offer managers and users a new perspective on their practices.

## **1. EMAIL STRESS FROM RECEIVERS' POINT OF VIEW**

In this first part, I analyse email *receipt* and thus the experience of *receivers*. Note that most articles on email focus on this experience of receipt, through phenomena such as overload (arising mainly from incoming emails) (Dabbish & Kraut, 2006), work interruptions (from incoming messages) (Jackson et al., 2003) and invasions of privacy (from receipt of messages outside working hours) (Mazmanian et al., 2013).

These phenomena could relate to stress from email as a source of threat. In many cases, however, articles study the experiences of receiving and sending in combination (items relating to both receiving and sending) or interaction (for example, concerning replying to received emails). Finally, users themselves are not always aware of the transition from sending correspondence to receiving it, as these experiences are sometimes temporally close (Jackson et al., 2003). Given that this article seeks to untangle these experiences conceptually, a deeper analysis is required.

### **1.1. The receiver interprets incoming emails and suffers from interruptions**

Email has been deemed an asynchronous communication tool, yet it is managed on an always-on basis by most users, generating interruptions, dependency and overload (Jackson et al., 2003; Kefi et al., 2021). It takes more than a minute on average to regain pre-interruption productivity (Jackson et al., 2003). The resulting loss of productivity leads receivers to have a rather negative perception of email in general, which is often seen as both the source and symbol of work stress (Barley et al., 2011) or a generic tool that should be replaced by a more suitable alternative (Bertin et al., 2020; Tarafdar et al., 2023). Sometimes, however, some emails are useful to the task in which the receiver is engaged, in which case the interruption may be beneficial (Addas & Pinsonneault, 2018) and therefore, from an email stress perspective, a source of opportunity (eustress) (Tarafdar et al., 2019). This qualifies as eustress because the interruption, even if beneficial, requires time and energy to process and therefore represents a difficulty to be overcome for its benefits to materialize. Receivers may also be waiting for emails they need (important information, replies to their own emails), which can lead to feelings of stress related to "underload," boredom, or exclusion (Stich et al., 2019b). These few useful emails, drowning in a continuous stream of useless ones, establish positive reinforcement similarly to a lottery, whereby users compulsively check their messages hoping to finally receive the one they need (Kefi et al., 2021). This mechanism, among others (e.g., intensive use, perceived control), can engender a kind of email addiction that harms receivers and users in general (Kefi et al., 2021). To counter these effects through coping strategies, the frequency of email retrieval (and therefore interruption) can be modified by adjusting the inbox parameters, with the optimal frequency evaluated at three deliveries per day (Kushlev & Dunn, 2015). Some organizations are also succeeding in spreading the idea that email is an essential and beneficial tool at work, making the experience of receiving it less painful (Sumecki et al., 2011).

In addition to constantly having to judge the relevance of incoming emails, receivers must manage to extract information from messages that are not always clearly worded (Soucek & Moser, 2010) and decode ambiguous emotional information (Byron, 2008; Kruger et al., 2005). Indeed, there is often a world between the emotion the sender is trying to convey (humour, sarcasm, empathy) and that perceived by the receiver (embarrassment, aggression, indifference) (Kruger et al., 2005)—all the more so because users are often not trained to write emails (Burgess et al., 2005; Soucek & Moser, 2010). This pressure to judge the usefulness and content of

incoming emails is exacerbated by the responsiveness expected of receivers in many organizations (Kushlev & Dunn, 2015), where the acronym ASAP ("as soon as possible") is commonplace.

### **1.2. The receiver manages the volume of emails and her inbox**

The uninterrupted flow of emails forces receivers to manage a high volume of messages (reading, sorting, replying) and develop strategies to do so (Kalman & Ravid, 2015). Studies generally agree that the average volume of emails received per day is at least 50 (Dabbish & Kraut, 2006; Kalman & Ravid, 2015; Norquay, 2025). Dealing with such a volume is time-consuming, accounting for up to a third of receivers' communication time (Barley et al., 2011; Dabbish & Kraut, 2006), and thus increases their workload and, in turn, their stress (Barley et al., 2011; Jackson et al., 2003). This time spent communicating by email does not replace face-to-face exchanges but adds to them—an overlapping effect referred to as the "millefeuille theory" (Boukef & Charki, 2019; Boukef & Kalika, 2006; Kalika et al., 2007). Despite the wide range of communication tools at their disposal (Boukef & Charki, 2019), individuals turn to email "by default" to interact (Tarafdar et al., 2023), notably because of its simplicity, versatility (Ducheneaut & Watts, 2005) and the multiple communication genres it enables (Yates & Orlikowski, 1992). Once read, for example, emails are frequently treated as files, i.e., kept and stored for future use, or as tasks or reminders for organizational purposes (Ducheneaut & Watts, 2005).

Users thus end up receiving numerous emails, even to the point of being confronted with a stressful feeling of email overload, in which the volume is deemed too great to be processed (Dabbish & Kraut, 2006). As a result, this volume sometimes spills over into private life to be managed (Mazmanian et al., 2013), with the sense of having one's life invaded by email generating further stress (Kefi et al., 2021; Mazmanian et al., 2013). Overload and overintensive use of email thus contribute to users' stress (Stich et al., 2019b) and technostress (Kefi et al., 2021) and to a deterioration in their working conditions (Barley et al., 2011) and quality of their managerial relationships (de la Rupelle et al., 2014).

The receiver's experience is therefore generally considered tedious (Barley et al., 2011), interruptive (Jackson et al., 2003), invasive (Mazmanian et al., 2013), overloading (Dabbish & Kraut, 2006) and stressful (Kefi et al., 2021), with the exception of some useful messages drowning in the continuous stream of useless emails (Addas & Pinsonneault, 2018; Sumecki et al., 2011).

## **2. EMAIL STRESS FROM THE SENDER'S POINT OF VIEW**

In this second part, I analyse the *sending* of emails and therefore the experience of *senders*. All communication involves a sender, a message and one or more receivers (Byron, 2008). However, in the context of email, few articles so far have focused exclusively on this experience of sending or responding. With approximately 30 emails sent per day on average (Kalman & Ravid, 2015; Norquay, 2025), sending is nevertheless central to email usage (Byron, 2008; Ducheneaut & Watts, 2005) and is in fact included in most measures of email volume (Dabbish & Kraut, 2006; Stich et

al., 2019b). Naturally, this section is linked to the previous one, as the sending of an email is often generated by receipt of an email beforehand (Byron, 2008). Thus, sending includes both the act of sending a message and that of replying. Finally, note that the term "receiver" may well refer to a user who is also a "sender": each user is in turn sender and receiver, depending on the messages (and both at the same time if the user sends messages to herself).

### **2.1. The sender determines the quantity of emails and is responsible for their quality**

In contrast to the receiver, who has no control over incoming emails, other than their flow (Kushlev & Dunn, 2015), the sender decides which emails to send and respond to, although this decision may be somewhat forced by certain social norms (Byron, 2008), as we will see in section 3.4. The sender is therefore the one who determines both the quantity and quality of the emails subsequently received. As far as quantity is concerned, composing messages takes time, which necessarily limits the flow of outgoing emails. However, each message can be sent to an unlimited number of receivers. Whereas "carbon copying" (writing on several superimposed pieces of carbon paper) used to be a time-consuming process, this feature can be used trivially in email correspondence. Copying many (too many?) receivers is a harmful but common practice, and a source of stress for many users (Addas et al., 2018; Burgess et al., 2005; Kalman & Ravid, 2015). A single sender can, in a single composed message, generate hundreds of emails to be processed (received, read, sorted) and as many work interruptions, productivity losses and work or information overloads.

Likewise, the sender determines the quality of the emails she receives. The sender is first responsible for choosing to communicate by email, rather than by another tool that might have been more relevant (Pillet & Carillo, 2016; Tarafdar et al., 2023). Communications initiated by email often continue in this mode, iteratively adding messages, tasks and receivers (Tarafdar et al., 2023). The sender then tries to convey information and emotions in the email—and often fails given the natural tendency to overestimate one's ability to do so (Kruger et al., 2005). For example, an email judged funny by the sender is rarely judged as such by the receiver (Kruger et al., 2005). It may even be perceived as an aggression and escalate into conflict (Friedman & Currall, 2003) and therefore stress (Cooper et al., 2001). Every email user (and correspondingly every office worker) has undoubtedly experienced or caused a situation of misunderstanding (Byron, 2008); indeed, even I, as the author of this text and an email expert, have done so. Thus, training senders to write more effective (concise, clear, well-addressed) emails produces a virtuous ripple effect by reducing the stress on their receivers (Burgess et al., 2005; Soucek & Moser, 2010).

There is therefore a power imbalance between sender and receiver in favour of the former (Derks & Bakker, 2010). Their hierarchical relationship further reinforces this power, as an email received from one's manager (the sender) causes more stress as it involves more interruptions, invasion of privacy, workload and cognitive effort for the subordinate (the receiver) to decode and interpret (Byron, 2008). This power

imbalance can also be seen in the stress related to bullying, where the bully can use email to extend harassment and control, notably by sending aggressive messages or messages outside working hours (Baruch, 2005). The sender's experience is therefore, from the point of view of email quantity and quality, a rather positive one of control.

## **2.2. The sender uses email to offload tasks and get on with work**

To gain a better understanding of the sender's experience, we need to look at the different ways in which email is used. As email is considered as much a productivity as a communication tool by senders (Bertin et al., 2020; Ducheneaut & Watts, 2005), one of its main uses is to delegate or accomplish tasks (Renaud et al., 2006). Sending or replying to an email is a way of unburdening oneself (Derks & Bakker, 2010)—or rather, of passing the burden on to its receivers. Email can also be used to protect oneself, as when managers are copied to keep them informed (Friedman & Currall, 2003). Pressing the send or reply button is therefore often a pleasant experience—one of a duty done (Dabbish & Kraut, 2006)—except when the information communicated is bad news or messages that need to be negative (Derks & Bakker, 2010).

The sender is also master of the time and conditions of sending and thus determines the response standards. The sender is responsible not only for using email in the first place to initiate contact or reply (Hoareau, 2021) but also for sending messages at times that suit her, including evenings or weekends (Mazmanian et al., 2013). Receivers therefore have no choice but to receive emails at these times, unless they can overcome their addiction and disconnect, thereby accepting that they might miss important information (Kefi et al., 2021). The responsiveness expected from receivers is also determined by the sender—often implicitly (Byron, 2008; Derks & Bakker, 2010) but sometimes explicitly through the use of importance indicators or acronyms. The hierarchical relationship is an example of implicitly defined responsiveness. An email sent by a manager can provoke a heightened sense of duty in his subordinate to respond promptly (Byron, 2008). At the organizational level, information technology (IT) charters and habits establish certain norms for email use, such as acceptable sending times (Mazmanian et al., 2013), the use of tools other than email (Pillet & Carillo, 2016) and respect for receivers' preferences (Tarafdar et al., 2023).

Except in the case of a few messages that are not very pleasant to send, the experience of sending and replying therefore seems more positive and stimulating than that of receiving (Derks & Bakker, 2010). Unlike the receiver, the sender is in a position of control (over the volume, quality and content of emails) and imposes her preferences and agenda (Dabbish & Kraut, 2006; Mazmanian et al., 2013; Sumecki et al., 2011)—sometimes to the dismay of the receivers.

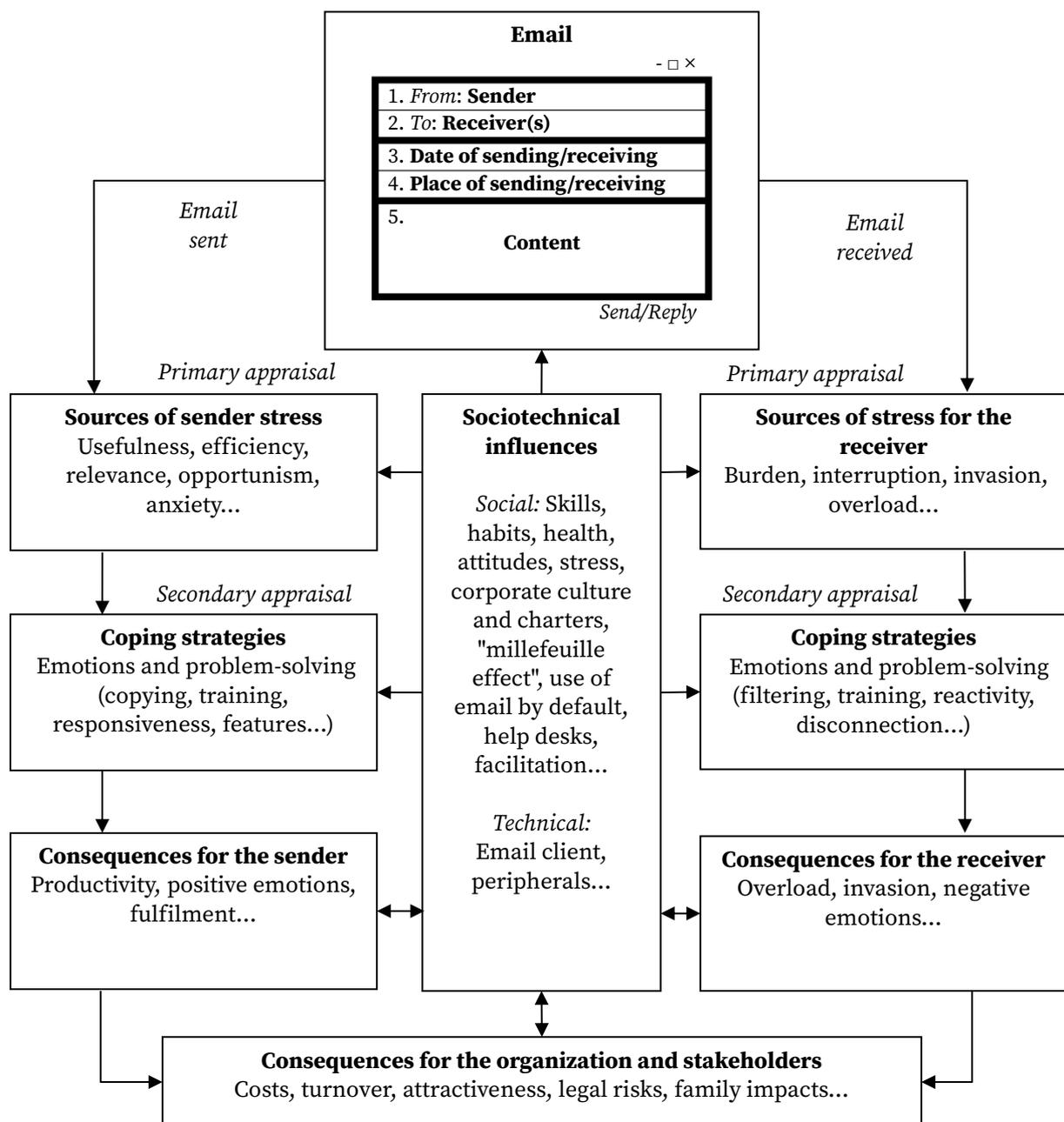
## **3. THEORIZING AND UNDERSTANDING EMAIL STRESS**

Now that the experiences of receivers and senders have been compared, I integrate these analyses to bring fresh insights to this literature and thus open new research

perspectives. Starting from the simple idea that every interaction comprises a sender, a message and one or more receivers (the SMCR model; Byron, 2008), I distinguish the literature on sending emails from that on receiving them. In fact, looking at usages is enough to notice that those concerning sending (task delegation, self-protection, questioning) differ from those concerning receiving (information acquisition, reminders, sorting) (Ducheneaut & Watts, 2005). However, articles on email stress often do not make their purpose explicit. For example, the phenomenon of email overload (Dabbish & Kraut, 2006) seems to relate essentially to the experience of receiving (too many or difficult-to-handle emails) and is therefore not really applicable to the experience of sending messages.

The sending and receiving processes therefore seem distinct, although they are constantly interacting discursively (in the form of responses to incoming emails). An email received often requires a reply. The sender dumping a task creates an additional task for the receivers (Derks & Bakker, 2010), and the sender who chooses to send an email over the weekend disturbs the private lives of receivers (Mazmanian et al., 2013). The choice (by the sender) to use email to interact imposes this tool on receivers, and indeed this tool often adds to rather than substitutes for others (Kalika et al., 2007).

As mentioned in the introduction, the theoretical framework proposed to open new research perspectives is based on the transactional model of stress and technostress (Lazarus & Folkman, 1984; Tarafdar et al., 2019). In this model, a (technological) situation can be appraised by the individual as a source of threat (distress) or opportunity (eustress)—this is the primary appraisal. The individual then evaluates coping strategies that would enable her to minimize the threat or maximize the opportunity—this is the secondary appraisal. Finally, the individual feels the consequences of the threat she was unable to avoid or of the opportunity she was able to seize. In contrast to other models of stress, the transactional model allows the study of both positive stress (eustress) and coping strategies, and these two elements seem to me to be essential in the literature on email use and stress. The model I thus propose as a synthesis of the literature (Figure 1) is explained step by step in the subsections below.



**Figure 1: Transactional model of email stress (TMES)**

### 3.1. Primary appraisal of email stress

This model of email stress, based on the transactional stress process and technostress studies (Tarafdar et al., 2019), begins with its technical artifact: the email itself. Functionally, an email comprises (1) a sender, (2) one or more receivers, (3) dates and times of sending and receiving, (4) places of sending and receiving, and (5) subject and content. Each of these elements is appraised by users and can represent a potential source of stress for them. For example, the hierarchical level of the sender (1) can generate stress in the receiver (Byron, 2008), as for example

demonstrated physiologically by the observation of increased blood pressure when critical emails are received from a superior (Taylor et al., 2005). The sender himself may be aware that the hierarchical level, whether higher or lower than that of the receiver, will influence the way his email is perceived and feel distress or eustress as a result. The sender may, for example, use that hierarchical position to obtain quick responses (Byron, 2008) or, conversely, feel intimidated by the idea of contacting someone higher up or with a very established reputation. These ideas are captured in the following proposition.

*Proposition P1:* The nature and status of the sender can influence his stress as well as that of the receiver.

Similarly, the nature of the receivers (2) can impact the email stress process for both sender and receiver. The common situation of multiple or numerous receivers being copied is particularly evocative in this respect and has been empirically studied multiple times (Burgess et al., 2005; Kalman & Ravid, 2015; Skovholt & Svennevig, 2006). For the sender, copying (and thus increasing the number of receivers) can contribute to the pleasant feeling of delegating tasks and protecting oneself (Skovholt & Svennevig, 2006) but also to the threatening feeling of having to increase vigilance to avoid any errors (such as forgetting an attachment). For the receiver, it can be threatening to constantly receive emails not specifically addressed to her, as captured by the famous problem of copying (Burgess et al., 2005; Kalman & Ravid, 2015). This threat is exerted mainly by the overload generated by these incoming emails with no real added value for the receiver (Burgess et al., 2005). Conversely, the receiver could also feel stimulated by being abundantly informed while being able to let others take over the task and handle the responses (Skovholt & Svennevig, 2006). In this case, the receiver's burden is essentially to sort and read incoming emails, but not necessarily to respond to them. The following proposition formalizes these ideas.

*Proposition P2:* The nature and number of receivers copied can influence both the sender's and the receiver's stress.

Emails are also characterized by the date (3) and place where they are sent or received (4). For example, sending an email outside one's place of work can be a source of threat to one's work–life balance, as it mobilizes cognitive and temporal resources (Derks & Bakker, 2010; Mazmanian et al., 2013). Conversely, sending can be a source of opportunity for this same balance. Studies having shown, for example, that the sender can exploit downtime in the day to remain in control of work through email sending (Mazmanian et al., 2013). The receiver can likewise take advantage of downtime outside the workplace and working hours to remain in control of the email flow and prevent her inbox from overflowing upon her return to the office (Dabbish & Kraut, 2006), an experience that falls under the heading of eustress because it still requires effort and sacrifice. Conversely, she may feel threatened by emails arriving at inconvenient times or places or sent by senders at late hours or from their places of leave, a stressful experience abundantly studied in empirical work on the hyperconnection engendered by email (Barley et al., 2011; Mazmanian

et al., 2013). In addition, email frequency (i.e., receipt of multiple emails on more or less frequent dates) can also be a source of stress, for example by causing stressful interruptions (Kushlev & Dunn, 2015) or by creating a feeling of underload or lack when a long period goes by without email (Stich et al., 2019b). Different combinations of sending or receiving places and dates can also lead to different experiences. For example, a user might need or want to deal with emails by staying in the office (place of sending/receiving) longer than expected or arriving earlier than expected (date of sending/receiving) (Barley et al., 2011). This combination (in the office, but outside working hours) could represent an opportunity, as the calm environment is conducive to concentration, writing and sorting emails. Similarly, emails can be processed during working hours but in transit (Mazmanian et al., 2013). This combination (within working hours but not in the office) can also represent an opportunity to the extent that it optimizes the use of downtime (Mazmanian et al., 2013). These arguments are the subject of the following proposition.

*Proposition P3:* The dates and places where email is sent and received can influence both the sender's and the receiver's stress.

Finally, email is, of course, essentially content (5). The sender often uses content to delegate or complete tasks and to get on with work (Bertin et al., 2020; Derks & Bakker, 2010; Ducheneaut & Watts, 2005; Renaud et al., 2006), in a stimulating experience of eustress. Sometimes, however, the sender may have to write difficult emails, deliver bad news or reprimand other employees (Friedman & Currall, 2003; Taylor et al., 2005), in which case the experience would be more threatening. The receiver, on the other hand, is subjected to the content addressed to her, and several reactions are possible. If the content proves useful to the task currently being performed, the email may be perceived as an opportunity to improve one's work (Addas & Pinsonneault, 2018). In many cases, however, the content—especially when long or not clearly calling for action—can be perceived as useless, aggressive or not very effective (Addas & Pinsonneault, 2018; Burgess et al., 2005; Friedman & Currall, 2003). These examples therefore point to an experience of threat (distress). The following proposition captures these situations.

*Proposition P4:* The content and form of the email written or received can influence both the sender's and the receiver's stress.

### **3.2. Secondary appraisal of email stress**

As soon as an email feature is appraised as a source of eustress or distress (primary appraisal), users assess which coping strategies can be deployed (secondary appraisal) (Tarafdar et al., 2019). Coping will consist of seizing the opportunity in the case of a eustress appraisal and avoiding the threat in the case of a distress appraisal. Stress models and empirical articles on technostress establish different types of coping strategies: for example, emotion-focused strategies (ruminating, expressing anger) and problem-focused strategies (asking for help, fixing bugs), or reactive strategies (distancing oneself, complaining) and proactive strategies (training, developing solutions) (Lazarus & Folkman, 1984; Tarafdar et al., 2019). Coping

strategies may also vary in contexts of ambivalence, where users have to reconcile their simultaneously negative and positive evaluations (Qahri-Saremi & Turel, 2020). In the case of email stress, the literature has explored various actions enabling users to control their emails and gain in productivity (Russell et al., 2023). Theoretical propositions related to coping are proposed and detailed below.

In the previous subsection, proposition P1 referred to the stress the sender might feel when sending emails to receivers of different hierarchical levels or status. Sending options (importance flag, acknowledgement of receipt) could support coping strategies to modulate the receiving experience and thus reduce distress or increase eustress; for example, a sender might mark an email sent to a superior as having "low" importance so as not to annoy her or mark an email sent to a subordinate as being of "high" importance to make the message more visible. The sender could also maximize the usefulness of the email sent by copying many people to keep them informed or reduce uncertainty by ensuring that at least one receiver has been apprised of the email content (Mazmanian et al., 2013). However, this common coping strategy is not without consequences for receivers (Tarafdar et al., 2023). For the receiver, automated sorting functionalities can help identify emails addressed directly to her to reduce her distress (overload) or increase her eustress (productivity) (Burgess et al., 2005). Reducing the frequency of checking for new emails to respond more reactively to incoming emails can also help receivers meet senders' (especially superiors') expectations and maintain control over their incoming email flow, as long as this reactivity is chosen and not suffered (Barber & Santuzzi, 2015; Russell et al., 2023). The following proposition addresses these problem-focused coping strategies.

*Proposition P5:* Sending and receiving settings (importance flags, checking frequency, receipt acknowledgements, copying, automated sorting) can enable the sender and receiver to reduce their distress or increase their eustress.

Regarding the stress associated with sending and receiving dates and places, senders and receivers may first seek to reduce their distress through a coping strategy involving disconnection. This disconnection may consist of simply not accessing email outside their working hours and place or, for the receiver, simply reducing the frequency of reading so as not to receive messages as soon as they are sent (Barley et al., 2011; Dabbish & Kraut, 2006). Conversely, hyperconnection can help maximize eustress by enabling senders to work when they like with a few sacrifices (e.g., drafting emails in the evening even if doing so involves delayed sending) and receivers to stay informed in real time and not miss out on any information (Barber & Santuzzi, 2015), making them feel like conscientious professionals, able to juggle tasks anywhere, anytime (Mazmanian et al., 2013). Disconnection, hyperconnection and checking frequency have already been the subject of much empirical work (Barley et al., 2011; Dabbish & Kraut, 2006; Mazmanian et al., 2013). These problem-focused coping strategies are the subject of the following proposition.

*Proposition P6:* Disconnection can help both sender and receiver reduce their

distress, while hyperconnection can help them increase their eustress.

Finally, stress related to the content of the email written or received can be influenced by training. The sender may, for example, choose to undergo training to maximize the impact of his messages, while the receiver may be trained to better decode incoming messages (Burgess et al., 2005; Kruger et al., 2005). For example, a sender who is not fully able to convey messages and emotions as desired in his emails exposes himself to misunderstandings or even conflicts with receivers (Friedman & Currall, 2003; Kruger et al., 2005) and therefore to distress. Similarly, a receiver with little ability to decode incoming emails may not understand them or may perceive them as aggressive. Training therefore represents an opportunity to reduce these threatening experiences and gain confidence in one's ability to encode and decode messages so that they can be understood by all. As with other sources of stress, training is an effective problem-focused coping strategy (Cooper et al., 2001; Tarafdar et al., 2019), as captured by the following proposition.

*Proposition P7:* Training can enable the sender and receiver to reduce their distress or increase their eustress.

### **3.3. Consequences for the sender, receiver, organization and stakeholders**

If coping succeeds (for eustress) or fails (for distress), consequences (positive for eustress, negative for distress) follow. For the receiver, for example, failure to regulate an excessively large flow of incoming emails (because of poorly designed or absent automatic sorting or lack of a filing and archiving strategy) can quickly engender a feeling of overload (Dabbish & Kraut, 2006), while success in regulating this flow can engender the pleasant feeling of having a tidy mailbox (Kalman & Ravid, 2015). For the sender, for example, failure to send messages or replies responsively can dampen the sense of accomplishment as tasks accumulate, while success can boost his sense of productivity (Mazmanian et al., 2013). Individual consequences can be psychological, such as overload, burnout (Barber & Santuzzi, 2015; Dabbish & Kraut, 2006), productivity and satisfaction (Kalman & Ravid, 2015; Russell et al., 2023). They can also be physiological in nature, as when aggressive incoming emails increase blood pressure (Taylor et al., 2005) or when email overload causes sleep disturbance (Barber & Santuzzi, 2015).

The consequences can extend beyond the individual. The hyperconnection caused by sending and receiving emails outside working hours, for example, can have family consequences as a result of work–life conflicts (Derks & Bakker, 2010). For the organization, the consequences of email stress are manifold. The literature on stress and technostress has extensively studied organizational consequences such as turnover, loss of collective commitment and costs linked to productivity losses (Cooper et al., 2001; Tarafdar et al., 2019). With regard to email in particular, the literature has looked at the costs associated with time spent writing and checking emails and costs linked to lost productivity from interruptions (Burgess et al., 2005; Jackson et al., 2003; Russell et al., 2023). Repeated misuse of email can also create a culture of “email-by-default” in the company, in which email is inefficiently used in place of other tools (Tarafdar et al., 2023), or a millefeuille effect, whereby

communications pile up in different channels (Boukef & Charki, 2019). Legal risks may also emerge from email stress if, for example, employers fail to act sufficiently to reduce it or to regulate the pressure on employees to answer emails outside working hours, which may amount to a form of on-call duty, or if stress reduces employees' defences against cyberattacks.

In addition, the email elements (sender, receiver, place, date, content) discussed separately so far can be combined such that their effects are reinforced or cancelled. As an example of a reinforced effect, an aggressive, poorly written email sent by a superior outside working hours can be particularly stressful for a subordinate receiver (Byron, 2008; Friedman & Currall, 2003). As an example of a cancelled effect, an email that is sent by a supervisor outside working hours but that is very short and well formulated and does not call for an immediate response may not be felt as a threat by the subordinate receiver, who might briefly take note of it in during her downtime (Mazmanian et al., 2013).

The literature review posited that the experience of sending could be more pleasant than that of receiving because the sender is in a position of control over the receiver (with respect to email frequency and content) and may feel productivity and satisfaction in offloading tasks (Dabbish & Kraut, 2006; Mazmanian et al., 2013; Sumecki et al., 2011), while the receiver suffers interruptions and overloads with little possibility of regulating the flow of incoming emails other than by delaying or categorizing them (Dabbish & Kraut, 2006; Sumecki et al., 2011). This idea implies that the process of sending should correspond more to eustress while the process of receiving should relate more to distress. It may seem exaggerated to speak of eustress in relation to email, a communication tool perceived as extremely easy to use (Tarafdar et al., 2023). Eustress necessarily implies an effort, a difficulty to be overcome outside one's comfort zone (Tarafdar et al., 2019). However, the process of sending is not as simple as it seems, as mentioned above. For example, sending emails at all hours to improve one's productivity requires personal sacrifice (Mazmanian et al., 2013), and composing a message capable of clearly delegating a task requires thought. In other words, the pleasure of the email sent is not effortlessly provoked, as the sender is by nature proactive. Accordingly, coping in the sending process should be more proactive, while coping in the receiving process should be both proactive and reactive. Indeed, coping in the context of eustress amounts to seeking to seize opportunities and therefore requires proactivity (Tarafdar et al., 2019). Proactive coping involves gaining control (emotional and behavioural) over upcoming situations (Pirkkalainen et al., 2019) and thus corresponds to the coping strategies presented earlier for senders (such as hyperconnection and training). The following proposition summarizes this idea.

*Proposition P8:* The sender will face more eustress, inviting proactive coping, while the receiver will face more distress, inviting reactive or proactive coping.

### **3.4. Sociotechnical characteristics**

This model includes internal and external influences of a sociotechnical nature. The first influence is social in nature and includes not only individuals and their

characteristics (skills, attitudes, etc.) but also other related individuals and groups (managers, colleagues, organization, family, etc.) and the relationships and interactions among all these individuals and groups. The second influence is technical in nature and includes the technical tools (software, algorithms, hardware) at the heart of the work (Sarker et al., 2019). These two influences interact. The sociotechnical perspective is at the heart of much work in information systems (Sarker et al., 2019) and also feeds into the transactional model of technostress (Tarafdar et al., 2019). Technical tools and their characteristics trigger the individual technostress process, and the individual then finds herself in constant interaction both with the technique itself (software parameterization, problem-solving) and with other individuals and collectives (seeking social support, soliciting technical support) during primary and secondary appraisals. Sociotechnical influences therefore apply to the entire email stress process for both receivers and senders. For example, senders' skills (in writing emails) and receivers' skills (in decoding emails) influence the entire model (Burgess et al., 2005; Soucek & Moser, 2010). Personality traits of senders and receivers—for example, their neuroticism or locus of control—can also influence email stress (Byron, 2008; Reinke & Chamorro-Premuzic, 2014). However, empirical studies have so far not identified any clear influence of demographic characteristics.

At the organizational level, corporate culture and usage charters naturally regulate both the sending and receipt of emails—for example, when they are too vague, engendering widespread and not always relevant use of email-by-default (Bertin et al., 2020; Tarafdar et al., 2023) or, when they actively encourage the embrace of more appropriate tools, reducing email use to a strict minimum (Bertin et al., 2020; Pillet & Carillo, 2016). Organizations can shape the role of the millefeuille effect in email stress by clarifying email's role among the tools available (eustress) or, conversely, by making email even more obsolete as other, more relevant tools proliferate (distress) (Boukef & Charki, 2019; Boukef & Kalika, 2006). In addition to these social norms of use, organizations often provide their members with IT support offering training, coaching and intervention. This support can reduce technostress (Ragu-Nathan et al., 2008; Tarafdar et al., 2019) and, in turn, probably email stress. IT support can, for example, help users set checking frequencies or set up automatic responses. They also intervene in the event of mail server breakdowns, which can be a source of stress for users. Finally, email stress can be influenced by the companies that design email clients. Compared to the email clients of the 2000s, modern clients are significantly richer in functionality. Outlook and Gmail, for example, now offer AI-assisted autoresponse features such as ChatGPT and automated translations. Modern clients integrate with other software, such as calendaring (creating events with a click), file storage (adding cloud attachments) and customer relationship management (CRM) and ticketing (creating a ticket from an incoming email). In the literature on technostress, these tool-designing companies are an integral part of the "technostress trifecta" and contribute to facilitating eustress or mitigating distress through the functionalities they develop (Tarafdar et al., 2019). The influence of sociotechnical features is cyclical, as these features contribute to email stress but

also feed on it, as, for example, when individuals faced with stress develop increasingly negative attitudes towards email (Barley et al., 2011; Stich et al., 2019a).

Moreover, senders and receivers constantly interact, generating a process of discursive stress (Friedman & Currall, 2003; Tarafdar et al., 2023). Email threads (conversations) can thus become the object of emotional contagion, sometimes leading to the escalation of conflict and the sending of increasingly aggressive emails (Friedman & Currall, 2003). The TMES is therefore somewhat cyclical, as emails sent and received generally require a response (the sender will be the receiver and vice versa). The sociotechnical influences discussed above reinforce this process by creating, for example, norms of responsiveness or usage (Boukef & Kalika, 2006). The TMES could thus evolve and contextualize with each iteration because of the discursive nature of email. Within the same email thread, users alternate between the roles of sender and receiver, define new norms of exchange and interpretation, and oscillate between distress and eustress (Friedman & Currall, 2003; Skovholt & Svennevig, 2006). Each email thread could thus contain multiple iterations of the TMES. This guiding idea is contained in the following proposition.

*Proposition P9:* Each message within the same thread contributes to contextualizing email stress and iteratively causing it in its participants, who alternate between the roles of sender and receiver.

Finally, the discursivity of the TMES remains fragile. Indeed, email users are often advised to question whether the communication tool is more appropriate than another (Tarafdar et al., 2023). It is therefore possible for the loop to stop at any time and for other communication tools to take over. As the TMES is specific to email stress, it cannot be applied to these other tools. It is also likely that the email that initiated the thread follows on from a conversation initiated elsewhere, as when a thread is created by a sender to leave a written record of an oral conversation (Skovholt & Svennevig, 2006). The millefeuille effect mentioned above refers to how all these tools overlap rather than replace each other, making professional communications hybrid and multitool (Boukef & Kalika, 2006; Kalika et al., 2007). Contrary to what might be suggested by our taking email as the starting point of the TMES, email stress is necessarily part of a more global use of diverse and superimposed tools. It is hence part of a broader process such as technostress (Tarafdar et al., 2019). This idea is captured in the following proposition.

*Proposition P10:* Email stress is part of the broader process of technostress because of the multitude of tools used to communicate in addition to email.

#### **4. DISCUSSION**

The theoretical framework proposed and detailed above has distinguished stress arising from the process of sending emails from that arising from the process of receiving it and has placed email stress in the broader contexts of technostress and stress at work (distress and eustress). In this way, the TMES revisits users' ambivalence towards email and, in so doing, opens new research perspectives and intervention opportunities. In this fourth and final section, I detail the theoretical

implications of the TMES, proposing a research agenda, and suggest additional avenues of reflection for the 4.5 billion users of email (Radicati, 2024).

#### **4.1 Opening new research perspectives – theoretical implications and research agenda**

This analysis of email stress and the model suggested (Figure 1) open several avenues for theoretical reflection and operationalization in empirical research. Overall, the TMES suggests the importance of distinguishing the stress and uses of senders from those of receivers. Few studies have yet done so (Derks & Bakker, 2010). Here, I have proposed that senders appear to be in a process of eustress, while receivers appear to be in a process of distress. The permanent oscillation between sender and receiver roles could thus explain users' ambivalence towards email, i.e., their contradictorily positive and negative emotions towards its use (Qahri-Saremi & Turel, 2020). This intuition may be confirmed or refuted through further quantitative work, which must develop measurement scales or experimental protocols that distinguish between these two uses. Researchers can explore this intuition in a qualitative, phenomenological way, for example, by attempting to gain a more detailed understanding of experiences and the meaning attributed to them by users. It would also be interesting to examine the social dynamics that make the stress and uses of senders interact with those of receivers. For example, millefeuille theory (Kalika et al., 2007) addresses the question of which communication tools are chosen and which are imposed. Other works deal with the collective impact of this choice, as when email becomes the default communication tool (Tarafdar et al., 2023). Future research could then focus on sender–receiver interactions in terms of message content (discursive evolution), date and place of sending and receiving (and the associated right to disconnect) or response expectations qualitatively by means of discursive analyses of email threads and corporate policies, for example, or quantitatively by means of dyadic studies or network analyses (Cucchi, 2004). Researchers could also further explore the question of TMES recursivity by, for example, looking longitudinally at feedback loops enabling email use to evolve such that the individual maintains a homeostatic equilibrium of use and stress (Stich et al., 2019a).

Although this article focuses only on email, it could also be envisaged that the experiences of sending and receiving could be applied to other discursive tools, asynchronous or not (e.g., instant messaging), but the TMES cannot be easily transposed to such contexts given that it was developed about email in particular. As a complement, it would be interesting to study how the experience of sending and receiving email can differently lead users to abandon email in favour of other tools (Bertin et al., 2020; Pillet & Carillo, 2016) or add other tools to it in a millefeuille effect (Boukef & Charki, 2019). Further work could also be carried out on coping strategies, seeking, for example, to categorize the different coping actions linked to email stress according to whether they are emotion-focused or problem-focused (Lazarus & Folkman, 1984) or proactive or reactive (Pirkkalainen et al., 2019). Finally, it might be interesting to study in more detail the links between email stress and technostress (Kefi et al., 2021), in one direction (email as a source of technostress) or

the other (technostress generating email stress).

In the same way that studies on technostress, initially focused on the "dark side" of technology, have gradually moved towards the study of more stimulating experiences (Tarafdar et al., 2019), more research could focus on the positive uses of email (Ducheneaut & Watts, 2005; Sumecki et al., 2011). From the receivers' point of view, eustress could also be generated by emails that are pleasant to receive because they are thoughtful or funny, in addition to useful emails (Ducheneaut & Watts, 2005). Consultation of email outside working hours, generally considered harmful, can also be a source of autonomy and therefore of satisfaction in a paradoxical and ambivalent way (Mazmanian et al., 2013). As email is so widely used at work that it becomes a "habitat" for employees (Ducheneaut & Bellotti, 2001), it can even generate surprisingly positive interactions such as romantic relationships (Hovick et al., 2003).

Finally, this analysis is part of an already abundant French-language research on email (de la Rupelle et al., 2014; Kalika et al., 2007; Kefi et al., 2021; Tahri & Fallery, 2010), notably under the impetus of Michel Kalika's work on millefeuille theory (Kalika et al., 2007). However, none of the articles cited here (whether French-language or not) seem to highlight any cultural or national specificities in email usage. For example, the right to disconnect introduced in France by the 2016 labour law could have created specificities in email uses in France. It is possible that users experiencing email addiction (Kefi et al., 2021) suffer more when their email is deactivated outside working hours (Stich et al., 2019b). Other cultural specificities could be studied (Hoareau, 2021).

#### **4.2. Shedding light on email practices and uses – managerial implications**

This article proposes several avenues of reflection for us email practitioners. These avenues should be relevant for many people, given the estimates indicating that more than half the world's population uses email to communicate (Radicati, 2024). First of all, email may not be doomed to remain a "source and symbol of stress" (Barley et al., 2011) and thus to be crucified and then replaced by seemingly more desirable alternatives (Pillet & Carillo, 2016). The characterization here from senders' point of view is quite different from that from receivers' point of view. For the former, email remains an easy-to-use and versatile tool, a source of productivity (Ducheneaut & Watts, 2005; Sumecki et al., 2011) and autonomy (Mazmanian et al., 2013). For the latter, distress is not inevitable, as solutions exist to make email less painful. These include email training (Burgess et al., 2005; Soucek & Moser, 2010) and frequency settings (Kushlev & Dunn, 2015).

Almost half a century after the first email was sent, and despite the exchange of more than 360 billion emails every day (Radicati, 2024), there is still a long way to go to restore this communication tool to a place in the hearts of office workers. This analysis underlines, for example, the importance of users developing a certain empathy for the uses of email (Kalika et al., 2007; Stich et al., 2019b; Tarafdar et al., 2023). This empathy can take the form of using communication tools preferred or deemed more appropriate by receivers (Tarafdar et al., 2023), developing a portfolio

of suitable tools (Kalika et al., 2007), or taking into account receivers' right to disconnect (Mazmanian et al., 2013). When I ask managers if they ever receive emails that are irrelevant, badly addressed or just plain bad, they all say yes. When I ask them if they ever send such emails, no one seems concerned. However, every email received has been sent, which underlines the importance of empathy and awareness of one's limits (Kruger et al., 2005). Finally, information systems and human resource managers have a role to play through the charters and practices they disseminate, which influence both the sending and receiving of emails. As an extension of the proposed model, these charters could distinguish measures and standards concerning sending emails from those concerning receiving them. Irrespective of these charters and practices, organizations would benefit from widespread use of email training, as it has proved capable of significantly reducing email stress for senders and receivers (including those who have not been trained but receive emails from those who have) (Burgess et al., 2005).

### **4.3. Concluding remarks**

The aim of this article was to shed light on how the distinction between sending and receiving emails can explain the ambivalent character of email stress. To do this, I identified and interpreted the main streams of research on email and then revisited them in a new theoretical model. I proposed my original interpretation of this literature in the first and second parts, where I divide email stress into receiver stress and sender stress, and in the third, where I proposed the transactional model of email stress to summarize this research and shed light on hitherto little-explored processes.

Research on email has been abundant over the last thirty years (Ducheneaut & Watts, 2005; Tahri & Fallery, 2010; Taylor et al., 2008), yet there is potentially much more to say. The proposed model (Figure 1) applies to email stress as it exists today, but recent or future developments, such as automated responses and summaries using generative AI and the integration of email into management software packages, could change the model.

Having mentioned these limitations, I conclude with a few thoughts on the future of email and, in so doing, of this article. Although email functionalities have evolved over the decades, this communication tool still resembles what it was in its early days (Ducheneaut & Watts, 2005). Its use is still so widespread that it does not seem likely to disappear (Radicati, 2024). A question then arises: What shall we do with this indestructible tool? Since the future seems likely to be written by email, how can we make it more desirable? There are still many challenges to be overcome before email can one day "pass as a letter in the post."

## **DECLARATION OF USE OF GENERATIVE ARTIFICIAL INTELLIGENCE TECHNOLOGIES**

No generative artificial intelligence technologies were used for this work.

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