

# Measuring employment precariousness in gig jobs: A pilot study among food couriers in Brussels<sup>1</sup>

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## Abstract.

**BACKGROUND:** Within the extensive literature on precarious working conditions in the gig economy, remarkably little attention has been paid to how we can formally assess precarity. The few existing measurement instruments that seek to capture precarity in the gig economy assess the characteristics of platforms as job providers, but do not consider the situation of individual gig workers. Moreover, these approaches do not account for the different employment statuses of gig workers.

**OBJECTIVE:** This research's objective was to adapt, test and validate the Employment Precariousness Scale (EPRES) to the context of food couriers in Belgium.

**METHODS:** Fieldwork observations were combined with primary survey-data (N = 123). The scale was validated by testing reliability and external validity.

**RESULTS:** Although the small sample size requires caution, the EPRES-gw (i.e., our adaptation for 'gig work') indicated sound reliability through sufficiently high internal consistency. The scale also showed good external validity through a significant positive correlation with poor well-being.

**CONCLUSION:** The scale's characteristics in empirical analyses compare to previous research using the EPRES among employees. The EPRES-gw is therefore a promising instrument for studying employment precariousness in gig jobs.

Keywords: Gig economy, precarious work, well-being, methodological challenges, food couriers, employment quality

## 1. Background

The past five decades were characterised by a flexibilisation of labour markets [1]. One of the most visible consequences is the decline of standard jobs, typified by security through full-time employment, permanent contracts, regular working hours and internal labour market careers [2]. Instead 'non-standard

jobs' have been on the rise. Moreover, a growing number of permanent jobs show features of non-standard jobs such as insecurity, unpredictability, unsustainable income, and low bargaining power [3]. Therefore, many researchers have argued that the de-standardisation of employment entails a movement towards precarisation [4, 5].

The digitalisation of labour markets has led to new business models that sharply increase de-standardisation by creating online platforms that match labour supply and demand [6]. Such platforms do not operate as traditional employers. Instead, they engage large numbers of workers – often independent

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contractors who perform demarcated tasks and can quickly be hired and dismissed [7]. Concerns have been raised on how digitalisation affects job quality [8]. One of the most prominent issues in this debate is the formal classification of gig workers as independent contractors, while many argue that they work as de facto employees [9]. This frequently results in a situation of insecurity and economic risk that is magnified by a lack of social protection [7].

The aforementioned model is clearly visible in the food delivery sector [10]. Ordering prepared meals online is becoming a common consumption habit, particularly in urban areas [11]. While many food couriers enjoy the intrinsic aspects of the job (e.g., working outdoors, exercise), many find the employment conditions (e.g., wage) problematic [8]. Therefore, it may be argued that the disruptive character of these jobs is primarily due to the employment relationship under which they are organised [12, 13]. Notwithstanding the strong theoretical grounds for assuming precariousness in gig work, few attempts have been made to develop a formal measurement instrument to assess employment precarity based on a fixed set of criteria [14]. The few existing measurement instruments that seek to capture precarity in the gig economy assess the characteristics of platforms as job providers, but do not consider the situation of individual gig workers. Moreover, these approaches do not account for the different employment statuses of gig workers. We propose to address these challenges through the adaptation of an existing, theory-based, multidimensional measurement instrument for employment precariousness (the 'EPRES').

In what follows, the position of food couriers within the growing gig economy is examined with a focus on changing employment relations. Subsequently, two existing assessments of precarity in this population and their limitations are evaluated.

### *1.1. The rise of the urban food courier*

In 1994, Pizza Hut was the first company to offer online pizza delivery [15]. Since then, the popularity of food delivery has expanded in several parts of the world, including Belgium [16]. Compared to the EU average, Belgium has fewer platforms, platform workers and clients [17]. However, the platform economy – including food delivery is growing rapidly [16] and the covid-19 crisis has further amplified this growth [18]. Most platform work in Belgium is locally based [16] and can be considered 'gig work', meaning that it concerns work tasks that cannot be

practiced online [19]. These jobs mostly take place in urban areas [11] and are typically performed by young men [17]. A recent study investigating the socio-demographic profile of food couriers in Belgium found that 85.5% were students and one third were migrant workers [20].

The rapid expansion of platform-mediated food delivery services and their employment relations and conditions are the subject of a broader debate on job quality and the future of work [21, 22]. Unlike traditional employment relations, digital platforms mediate the relationship between a courier, a restaurant and a customer, acting as 'shadow employers' [7]. The transformative power of gig jobs therefore relates to the new type of employment relationship they shape [23]. As for many other activities organised via digital labour platforms, the work of a food courier already existed before food delivery platforms emerged. Therefore, the employment relationship – brokering 'gigs' mediated by online platforms [19] – is deemed disruptive rather than the job content [23]. This 'disruptive nature' mainly refers to the difficulty of classifying these jobs within the classic 'salaried' versus 'self-employment' dichotomy [24].

Much has been written about the transformative power of gig jobs in terms of employment relations, both from a rather optimistic and fairly pessimistic perspective. The optimistic view considers the gig economy a driver of entrepreneurship: it enables people to put underutilised assets to work and as such expand their economic opportunities. From this perspective, the gig economy offers a wide range of easily accessible, flexible work, thereby granting labour market access to previously excluded workers [25]. At the same time these workers provide new and low-cost services to consumers [21]. Critics have nuanced this positive narrative of gig jobs by arguing that this flexibility generates many disadvantages for the workforce. The core argument is that companies can use these forms of flexible employment to further undermine the stability, social rights and collective representation of 'standard' workers [7]. From this perspective, digital labour platforms can be perceived as an extreme example of a much wider trend towards de-standardisation of the SER-employment regime resulting in a gradual 'precarisation' of employment [23].

The job of food courier is considered exemplary of precarious gig work [7]. Food couriers usually work 'on demand', which means that the availability of work directly depends on the market [26]. Consequently, there is little certainty of continued

employment. Secondly, hiring workers for the ‘gig’ rather than as full-time staff, ensures employers more liberty in adjusting employment and wages entirely to their needs without any liabilities towards their workforce [7]. Market risks are passed on to employees, costs such as benefits, unemployment and health insurance or sick pay are avoided and minimum wage norms are not met [27]. This is particularly problematic as couriers are at an increased risk of involvement in traffic accidents and often lack appropriate occupational health and safety measures [28, 29]. Their poor collective representation and corresponding lack of bargaining power makes it harder for couriers to enforce protective rights, such as unemployment and health insurance [30]. Finally, gig jobs also shift the focus from ‘building a career’ (jobs with growth opportunities) to ‘performing a gig’ (one single task) [31]. Food delivery companies often claim that couriers can acquire useful ‘employability skills’ and ‘soft skills’ and that their gig job can be a steppingstone to a long-term career (e.g., the ‘Deliveroo academy’). However, whether the high turnover rates [32] are indeed indicative of such a steppingstone pattern is questionable. The business model of these platforms is based on a quasi Tayloristic task fragmentation (accept one order, pick it up, deliver it) designed to make limited use of skills [33] and skill development [34].

### *1.2. Existing assessments of precarity in gig work and their limitations*

After World War II, stable, full-time employment that guarantees a living wage, social protection and predictable working hours, became an acquired right for a substantial part of the workforce [1]. This is often referred to as the ‘standard employment relationship’ (SER). This regulated framework of employment conditions and relations was an important aspect in constituting the power position of workers in relation to their employers [35]. However, when platform companies hire workers as independent contractors and not as employees, they fall outside the safety nets provided by SER-employment [8]. As platform-based food couriers share similar characteristics (irregular working hours, low bargaining power) with other precariously employed worker populations, the precarious nature of their jobs may be suspected [36]. Nevertheless, few studies have attempted to identify precarity in gig jobs empirically using a formal measurement instrument [14]. The development of measurement instruments in this

domain is necessary 1) to achieve a common understanding of employment precariousness in gig work [37], 2) to identify it properly and to study its consequences and antecedents [38], and 3) to base policy recommendations on these comparable findings [14].

One of the best-known and most recent evaluations of precarity in gig work is the Fairwork project by Graham et al. [39]. This action research project is designed to promote greater transparency about working conditions in the gig economy and to encourage fairer working arrangements. This project aims to develop rating schemes to determine whether platforms are providing ‘decent work’. It adopts a platform-oriented approach; platforms are scored, evaluated, ranked and compared alongside five dimensions (i.e., pay, conditions, contracts, management and representation). This research offers a contribution to the understanding of what precarity – in many ways the opponent of fairness – entails in the gig economy. A focus on the platform has the advantage of holding companies accountable for their policy strategies regarding employment relations with their workforce [9]. However, this perspective is not concerned with the employment situation of individual workers, whereas this is essential in order to assess the impact on their psychological and physical well-being [40]. Such an empirical tool would thus complement the Fairwork project.

The multidimensional conceptualisation of precariousness by Kahancová and colleagues [14] develops a clear delineation of precarity specifically applied to the gig economy in Eastern-Europe. It contains six dimensions: income, working time, autonomy, job security, social security, and representation. This measurement instrument is focused on capturing different types of gig work and evaluates how gig work impacts the overall configuration of precarity and related labour market institutions. However, there are some limitations to this approach.

Firstly, within the six dimensions of precariousness no distinction was made between intrinsic job characteristics and characteristics of the employment relationship, which makes it an indicator of job quality rather than of precarious employment [41]. Autonomy, for example, is an intrinsic characteristic of the job itself, whereas the concept of precarity addresses degrading employment conditions and relations [1]. Secondly, although the six dimensions are theoretically subsumed in the concept of precarity, the tool treats all six aspects of precarity as separate indicators [14]. However, we are convinced that the accumulation of several adverse employ-

ment characteristics is precisely that which defines ‘precarious employment’ [42]. A closer look at the dimensions can provide insight into the problematic aspects of a particular gig sector. Nevertheless, we believe that a more detailed focus should not overshadow the fact that precarity reflects an overall situation of powerlessness that occurs in the interplay of different employment characteristics [43]. Finally, while this instrument identifies the heterogeneity of the gig work population as an important issue [44], it does not provide a methodology to assess important contextual factors. For example, the impact of employment precarity differs significantly between students who do gig work as a side job and workers who entirely depend on gig work for their livelihood [44]. Measurement instruments for employment precariousness must therefore allow a differentiation between specific types of gig workers.

In the next section the potential of the EPRES-scale is highlighted as an alternative measurement instrument that – if adapted to the reality of gig-work – can overcome the lacunae of the aforementioned instruments.

## 2. Objective

The concept of employment precariousness is embedded in a research tradition that seeks to understand the transformation of the post WWII standard employment model and the new social fault lines emerging from that transformation [45]. Using the EPRES-scale allows for a better understanding of the employment situation in the gig economy in relation to these broader trends and changes [46].

The EPRES, originally developed by Vives et al. [2] in Spain, consists of seven dimensions related to employment conditions and relations: 1) temporariness (contract duration), 2) disempowerment (representation and participation), 3) vulnerability (interpersonal relations and administrative issues), 4) workplace rights (lack of access and power to exercise rights), 5) economic unsustainability (low or unstable income), 6) undesirable working times (long, irregular, unpredictable or at ‘unsocial’ moments) and 7) low employability opportunities (training and internal labour market careers) [43].

The scale is constructed based on self-reported data collected from a worker perspective [47]. The EPRES has already been applied in various countries (a.o. Sweden, Chile, Norway, Portugal, Greece and recently Belgium) and can contribute to

cross-national comparative research [48, 49]. This theory-based, multidimensional tool has been shown to capture the relationship with health-related outcomes, in particular (mental) well-being [35].

Nonetheless, the EPRES has primarily been used among formal employees, often excluding students, self-employed workers and informal workers [50]. The main reason for this exclusion is that the instrument is currently insufficiently adapted to situations surpassing the ‘traditional’ waged employment relationship [48]. This is certainly also the case for gig workers. Furthermore, this population is ‘hard to reach’: large-scale survey data are scarce and often of poor quality [51]. Nevertheless, for the gig economy – and especially for food couriers [52], the impact of (precarious) employment arrangements on health and well-being is important, certainly from a policy perspective. Developing an understanding of how we can adapt and apply existing measurements of precarity to gig workers is therefore an important endeavour.

This study aims to make a contribution by adapting, testing and validating the EPRES among platform-based food couriers in Brussels. This ‘new’ version will be referred to as the EPRES-gw (EPRES-gig work). We believe that a detailed overview of the construction and validation of the measurement instrument could be a useful starting point for many other researchers seeking empirically to assess precarity among gig workers. The objective of this study is therefore twofold: to report on the construction and adaptation of the measurement instrument for precarity in gig work and subsequently to test and validate it. This paper presents the results of a pilot study with platform-based food couriers. It constitutes a first important step towards a broader assessment of precarity in gig jobs. Our first research question is therefore:

- RQ1 Adaptation: Which dimensions of the EPRES require adaptation to the context of the gig economy and how?

To validate the adapted instrument, two quality criteria will be evaluated:

- RQ2.1 Reliability: Are the items a reliable representation of the dimensions underlying EPRES-gw? We expect internal consistency between the items in the sub-dimensions of the EPRES-gw (H2.1).
- RQ2.2 External validity: Are the findings of the study consistent with the results from previous research in other Belgian and inter-

national worker populations that made use of the EPRES? We expect higher precarity scores among younger, female food couriers with low educational levels or a migration background that work exclusively as a food courier (H2.2). We also expect a positive correlation between the degree to which a job is precarious and adverse scores on well-being (H2.3).

### 3. Methods

#### 3.1. Data collection

Platform-based food couriers in Brussels are the target population of this study. Two types of data collection methods were used, namely qualitative fieldwork and a quantitative survey. The fieldwork was implemented to support the survey development. This involved an adjustment of the original EPRES to platform-based food couriers. The adaptation process entailed searching for alternative indicators that appropriately reflect the seven EPRES-dimensions in gig work. To this end, three sources of information were used: a literature review on gig work in the food delivery sector; a review of other research instruments on gig work [9, 14, 20] and personal contacts with

food couriers. The latter consisted of short and longer informal conversations with couriers on the streets of Brussels (from February to April 2021), attending events (such as worker protests), observations in social media groups and discussions with trade unions, courier collectives and other key informants.

The survey was made available online in French, Dutch and English. Attention was paid beforehand to the intelligibility of the questions, by testing the survey with a pilot group ( $n = 12$ ). Flyers with QR codes were circulated in order to distribute the survey. The first author was regularly present in person at places where couriers gather to promote the survey. Moreover, snowball sampling techniques were also used. The survey was shared through the social media network of the ‘Koerierscollectief’ (‘courier collective’) as well as through those of the two largest trade unions in Belgium: the Socialist (ABVV) and the Christian (ACV) trade union. The research sample ( $n = 123$ ) relates to a convenience sample. Table 1 gives an overview of the sample characteristics.

#### 3.2. Indicator construction

*Precarious employment.* After designing and conducting the survey, the EPRES-gw was con-

Table 1

Sample characteristics: gender, age, educational level, employment status and migration background ( $n = 123$ )			
Item	Response options	n	%
Sex	Male	91	74.0
	Female	8	6.5
	Other/Missing	24	19.5
Age	0–18	7	5.7
	19–25	45	36.6
	26–30	21	17.1
	31–40	20	16.3
	41–60	3	2.4
	60+	1	0.8
	Other/Missing	26	21.1
Educational level	Low-educated	2	1.6
	Higher secondary education	33	26.8
	Higher education	44	35.8
	Unrecognised diploma	16	13.0
	Other/Missing	28	22.8
Employment status	Other job besides food courier	21	17.1
	Student	42	34.1
	Looking for a job	20	16.3
	Exclusively working as a food courier	12	9.8
	Other/Missing	28	22.8
Migration background	Born in Belgium and both parents born in Belgium	16	13.0
	Born in Belgium and (one of the) parents not born in Belgium	27	22.0
	Not born in Belgium and (one of the) parents not born in Belgium	54	43.0
	Other/Missing	26	21.1

Source: EPRES-gw survey (own analysis).

structured as a sum scale including seven dimensions: temporariness, disempowerment, workplace rights, vulnerability, undesirable working times, economic unsustainability and low employability opportunities. Precarity was thus operationalised as the accumulated occurrence of adverse scores on each dimension (Table 2). Dimensions sometimes consisted of several sub-dimensions and a series of sub-items. The sub-dimensions within each dimension were first constructed separately by adding the items and then dividing them by the total number of items. Then, to construct the entire dimension, this step was repeated by adding all sub-dimensions divided by the number of sub-dimensions. This means that all dimensions and sub-dimensions were given equal weight in the final measurement instrument, regardless of the number of sub-dimensions per dimension, or number of items per sub-dimension. Each sub-dimension was coded so that a score close to 1 indicated the most precarious situation and a score close to 0 indicated the least precarious situation. The final sum scale thus expresses an overall, decimal score for precarious employment ranging from 0 to 1.

*Poor well-being.* The WHO-5 index, was used as an indicator of poor well-being. It consists of five statements (felt cheerful and in good spirits; felt calm and relaxed; felt active and vigorous; woke up feeling fresh and rested; my life has been filled with things that interest me) to be answered using a five-point Likert scale ('all the time' to 'at no time') [53]. A sum scale was calculated for each respondent expressing a continuous decimal score ranging between 0 (good state of well-being) and 1 (poor state of well-being) for poor well-being ( $\alpha = 0.886$ ).

*Sociodemographic variables.* The EPRES-gw scores were compared between different demographic and socio-economic groups: sex (male/female); age (25 or younger, 26 to 35 and older than 35); level of education (no education + higher secondary education, higher education and unrecognised diploma); migration background (born in Belgium and parents born in Belgium, born in Belgium and (one of the) parents not born in Belgium, not born in Belgium and (one of the) parents not born in Belgium); and employment status (other job besides food courier, student, looking for a job and exclusively working as a food courier).

### 3.3. Data analysis

*Qualitative data analysis.* The fieldnotes were coded thematically according to the dimensions of

the precarity scale, following Burawoy's extended case method approach [54] in which theory guides fieldwork interventions and locates situated knowledge within a broader context of determination (i.e., precarious labour theory). The fieldnotes had both confirmatory (underlining the operationalisation of a dimension) and informative roles (shedding light on additional aspects of a dimension) [55]. The seven dimensions used to compile the EPRES-gw are hence the result of an extensive adaptation process that is presented in the results.

*Quantitative data analysis.* The metric potential of the EPRES-gw was evaluated by assessing both the criteria of reliability and (external) validity (see objectives). Reliability was tested via the calculation of Cronbach's Alphas and a correlation matrix (H2.1). To test for external validity, we examined the comparability with previous research on precarious work among other Belgian worker populations (EPRES-Be: [25]). This was tested via the distribution of the EPRES-gw scores by demographic and socio-economic groups (H2.2) and the statistical relationship between EPRES-gw and poor well-being (H2.3).

## 4. Results

The first part of the results describes the adaptation process of the EPRES for employees to an instrument applicable to food couriers (RQ1, see Table S3). For each dimension, the conceptual considerations, fieldwork findings and adjustments are discussed. The resulting EPRES-gw is shown in Table 2 and is quantitatively validated in the second part of the results.

### 4.1. Qualitative results: Adaptation process and construction of the EPRES-gw

#### a) Temporariness

This first dimension aims to capture contract instability, referring to the increase in non-standard contracts and the corresponding increase in flexible work forms [47]. Permanent contracts are considered the least precarious, while forms of temporal or triadic employment are considered precarious to various extents [56]. The underlying rationale is that an employment contract acts as the main gateway to labour protection [57].

The contractual status is perhaps the most discussed aspect of gig work. Many food couriers work as independent contractors, but this status may not

Table 2  
Operationalisation of the EPRES-gw based on employment research in Belgium and adapted to food couriers

Dimensions	EPRES-gw for food couriers	Indicators
<b>1. Temporariness</b>	<p><b>Variations within unstable contracts</b> A contract of indefinite duration, a job student, a temporary contract, a temporary agency job, a flexi-job, a self-employed contract (P2P, fully independent, student-self-employed) or no contract</p>	<p>Response options and coding (0 = least precarious, 1 = most precarious)</p> <p><b>Variations within unstable contracts:</b> With what contract do you work as a food courier at your platform? 0. As an employee with a contract of indefinite duration + As a job student 0.33 As an employee with a temporary contract + As a temporary agency job + As a flexi-job 0.66 As a self-employed (P2P, fully independent) + As a self-employed student 1. No contract + I don't know</p>
<b>2. Disempowerment</b>	<p><b>No worker representation</b> Being a member of an organisation that defends food couriers' interests (including alternative interest groups)</p> <p><b>No participation in workplace issues</b> Involvement of the worker in the regulation of the following working conditions: how often one works; which jobs one can take on; the way one does their job; the working times</p>	<p><b>No worker representation</b> Are you a member of an organisation that defends your interests? 0. Yes (trade union or riders collective) 1. No</p> <p><b>No participation in workplace issues</b> (<math>\alpha = 0.812</math>) How are the following four aspects of your work arranged? Think about the most common situation. <i>How often I work.</i> <i>Which jobs I take on.</i> <i>The way I do my job.</i> <i>The times when I work.</i> 0. I choose this myself 0.5 I partly choose this myself, and partly depend on the platform and the app 1. It is imposed on me without consultation by the platform and the app</p>
<b>3. Workplace rights</b>	<p><b>Variations within a lack of workplace rights</b> (e.g., contributions to the costs of equipment, medical insurance, a fixed wage, etc.)</p> <p><b>No exercise of rights</b> This subdimension was not included because couriers cannot legally enforce the above rights, as they are not entitled to them</p>	<p><b>A lack of four workplace rights</b> (<math>\alpha = 0.774</math>) <i>"My platform contributes to the costs of my equipment (e.g., a helmet, bicycle, clothing, mobile phone,...)"</i> <i>"If I have an accident while performing my job, I am medically insured"</i> <i>"If I cause damage to third parties or their goods during my work, I am insured"</i> <i>"I am entitled to a fixed wage in addition to the amount I receive per order delivered"</i> 0. Totally agree + Slightly agree 0.5 Partially agree, partially disagree 1. Slightly disagree + Totally disagree + I don't know</p>

(Continued)

Table 2  
(Continued)

Dimensions	EPRES-gw for food couriers	Indicators
<b>4. Vulnerability</b>	<p><b>Authoritarian treatment</b> Adverse aspects in an authoritarian relationship with the platform through the app and the associated algorithm (e.g., being concerned about exclusion from the platform, feelings of being easily replaceable, etc.)</p> <p><b>Abusive treatment</b> Abusive treatment by the platform through the app, the associated algorithm and in relation to customers and restaurants (e.g., being treated unfairly or discriminately at work and fear to argue about it)</p> <p><b>Being cheated</b> Incorrect administration of wage</p> <p><b>Being uninformed</b> Being uninformed about the health and safety risks inherent to the job and difficulties in communicating easily with the platform in case of a problem</p>	<p>Response options and coding (0 = least precarious, 1 = most precarious)</p> <p><b>Authoritarian treatment</b> (<math>\alpha = 0.615</math>)  <i>“If I temporarily underperform at work, I should be concerned about fewer job opportunities, less wage or exclusion from the platform”</i>  <i>“If I were to participate in a protest action, I should be concerned about less job opportunities, less pay or exclusion from the platform”</i>  <i>“The platform through which I work (most) for gives me the feeling that I am easily replaceable.</i>            0. Slightly disagree + Totally disagree            0.5 Partly agree, partially disagree + I don’t know            1. Totally agree + Slightly agree</p> <p><b>Abusive treatment</b> (<math>\alpha = 0.637</math>)  <i>“I am treated unfairly or discriminately at work”</i>  <i>“If I were to be treated unfairly, I wouldn’t dare to argue.”</i>            0. Slightly disagree + Totally disagree            0.5 Partly agree, partially disagree + I don’t know            1. Totally agree + Slightly agree</p> <p><b>Being cheated</b>  <i>“The payment of my salary and optional premiums usually happens correctly.”</i>            0. Totally agree + Slightly agree            0.5 Partially agree, partially disagree + I don’t know            1. Slightly disagree + Totally</p> <p><b>Being uninformed</b> (<math>\alpha = 0.600</math>)  <i>“I am well informed about the health and safety risks inherent to my job”</i>  <i>“If a problem arises, I can communicate easily with my platform in order to resolve it.”</i>            0. Totally agree + Slightly agree            0.5 Partially agree, partially disagree + I don’t know            1. Slightly disagree + Totally</p>
<b>5. Undesirable working times</b>	<p><b>Long working hours</b> High number of working hours per week as a courier on the platform through which one works most, indicating more dependence on this job</p> <p><b>Working times irregularity</b> Treated in the economic instability-dimension: unpaid overtime</p> <p><b>Unpredictable working times</b> Treated in the disempowerment dimension: participation in setting working times</p>	<p><b>Long working hours</b> How many hours per week do you work on average as a courier with the platform through which you work most?            0. 0–16 hours a week            0.5 17–32 hours a week            1. More than 32 hours a week</p>



	<p><b>Work at ‘unsocial’ times</b> Work often per month during the following moments: between 5 pm and 10 pm; weekends; during a public holiday</p>	<p><b>Working during ‘unsocial’ times</b> (<math>\alpha = 0.688</math>) Can you indicate how often you work on average per month at the following times? “I work... between 5 pm and 10 pm” “I work ... on weekends” “I work... on a public holiday” 0. Never + I don’t know 0.33 Sometimes 0.66 Regularly 1. Always</p>
<b>6. Economic unsustainability</b>	<p><b>Low income</b> Low monthly gross income out of the job of courier via the platform through which one works most</p> <p><b>Lack of non-wage benefits</b> Rain premium, corona premium, peak period premiums</p> <p><b>Unpaid overtime</b> High number of unpaid working hours (e.g., waiting for an order, waiting for a ride, ... )</p> <p><b>Under/overemployment</b> Not being satisfied with the number of hours per week that one can work as a courier, both too many and too few working hours</p>	<p><b>Low income</b> What is your monthly gross income (net of tax) that you earn as a courier via the platform through which you work most? 0. Two highest income quartiles 0.5 Second income quartile 1. Lowest income quartile <b>Lack of non-wage benefits</b> “I am entitled to at least one of the following reimbursements: rain premium, corona premium, peak period premiums” 0. Totally agree + Slightly agree 0.5 Partially agree, partially disagree 1. Slightly disagree + Totally disagree + I don’t know <b>Unpaid working time</b> How many of your working hours are unpaid (e.g., waiting for an order at a restaurant, waiting for a ride that you can accept, ... )? 0.&lt;10% 0.5 10% – 40% 1.&gt;40% <b>Under/overemployment</b> Are you satisfied with the number of hours per week that you can work as a courier? 0. Yes 0.5 No, I would like to work less 1. No, I would like to work more</p>
<b>7. Low employability opportunities</b>	<p><b>Lack of opportunities</b> Not being given the opportunity to learn something new</p>	<p><b>Lack of opportunities:</b> “The platform through which I work (most) offers me the opportunity to learn something new.” 0. Totally agree + Slightly agree 0.5 Partly agree, partially disagree + I don’t know 1. Slightly disagree + Totally disagree</p>

truly reflect the actual employment relationship [58]. Food couriers do not have the autonomy associated with self-employment, but do bear the risks that come with it [59]. For example, they have no influence on price setting and cannot charge for overtime (e.g., waiting times), but bear the economic risks of fluctuating demand. To operationalise this dimension, their employment relationship should therefore by default be considered insecure and temporary and often takes place in a legal ‘grey zone’ [19]. Or as one of the couriers we spoke to during the fieldwork put it: “It is not a real contract” (authors’ own fieldnotes). Despite this common uncertainty, there is variation in the employment arrangements of food couriers as they do not always share the same characteristics [58]. Open-ended contracts are scarce among food couriers and many work as job students<sup>2</sup>[20]. The latter usually have a relatively favourable and transparent employment status, including a tax advantage applicable to all student-workers. Job students are also insured for occupational accidents and should have a temporary employment contract [60]. Other forms of employment arrangements include temporary (agency) work and ‘flexi-jobs’ (i.e., a specific employment regime for multiple job holders in Belgium). These type of contracts are moderately stable and involve a certain degree of social protection and social security entitlement [61]. Self-employed couriers (the majority) find themselves in a more unstable situation as platforms can terminate the collaboration without prior notice [10]. Moreover, the self-employed are responsible for complying with all registration procedures, managing the financial and administrative aspects of their work and revenue, and must pay their own social security contributions [62]. The fieldwork revealed that this is not always clear to couriers: key informant 1 mentioned that several of his colleagues had to pay more taxes than initially anticipated, leaving them in an unexpectedly precarious financial situation (authors’ own fieldnotes). Finally, some of the couriers work without any formal work arrangement. Often they are not aware of this informality. This we assumed to be the most precarious situation.

#### b) Disempowerment

‘Disempowerment’ consists of two sub-dimensions: collective representation and the

worker’s voice regarding important aspects of their employment conditions (e.g., the work schedule) [63].

Trade unions struggle to represent food couriers, inter alia because the regular institutional frameworks do not apply to them [64]. Furthermore, gig jobs raise new social questions for unions, for example in terms of privacy protection and the so-called ‘algorithmic management’ [65]. Finally, the turnover among couriers is very high, which makes it difficult for unions to retain these workers [30]. Consequently, unions are trying to adapt to this changing situation by launching new initiatives to reach gig workers [30]. An example of such an initiative is traditional union workers who regularly take to the streets with small ‘gifts’ such as bicycle lights, a bottle of water on a hot day or a reflective vest in order to make contact with couriers (authors’ own fieldnotes). In addition to trade unions, alternative courier collectives have developed [30]. Although these collectives may stem from traditional trade unions, they are separate organisations with their own name and board. One such example is the collective ‘*Coursiers en Luttés*’ (‘struggling couriers’), which emerged in Brussels from the youth work of the Christian trade union and was founded during the data collection period. To account for this diversity, the questionnaire contains items on any form of representation, not only the traditional trade unions.

The operationalisation of the second aspect of disempowerment, the individual participation of workers in their employment conditions, was taken from the original EPRES-Be (Table S3, appendix). The autonomy couriers have regarding their working hours and tasks is often propagated as an advantage of gig jobs [52] and an important job motivation [59]. However, this supposed autonomy has been challenged in research [19], making assessment important.

#### c) Workplace rights (and benefits)

This dimension reflects a lack of entitlement to established workplace rights (e.g., paid holidays, paid sick leave, pensions, ...) [43]. It aims to evaluate the extent to which acquired workplace rights are undermined in (precarious) jobs [66].

As they are generally casual employees, food couriers are not entitled to unemployment benefits nor labour protection and have no right to occupational health care [34]. For this dimension, the majority of food couriers are thus potentially exposed to sub-optimal rights [58]. We therefore searched the literature and used fieldwork to find alternative workplace rights specific to couriers.

<sup>2</sup>In Belgium, a specific employment arrangement is available for students aged 15 and above, whose primary activity is studying, alongside their work. These so-called ‘job students’ are permitted to work up to 600 hours annually.

Firstly, some platforms offer equipment (helmet, bicycle, clothing, etc.), either to rent or occasionally free of charge [67]. Others do not, and in that case, couriers must provide their own equipment. Furthermore, in the event of a defect, the replacement or repair of the equipment can be arranged by the platform or charged to the courier himself [67]. For example, during the fieldwork we visited a Just-Eat ‘hub’. These are physical locations in the city where couriers can pick up their bikes. There are also lockers, a coffee machine, staff, toilets and a repair room where they can have technical defects fixed (authors’ own fieldnotes). Couriers who are (partially) reimbursed for their purchasing their equipment and defects to their equipment thus have an advantage.

The second and third indicator of workplace rights concerns accident and liability insurance. The fieldwork and literature demonstrate that having insurance is one of the major concerns of food couriers [67]. Some platforms offer insurance in case of accidents, but many couriers drive unprotected [68]. This also applies to third-party liability. During the fieldwork, this subject arose several times, including in the story of key informant 4 who had an accident almost a year ago. He was incapacitated for over a month and the platform did not intervene financially. He also had to pay for the damage to his vehicle (authors’ own fieldnotes).

Fourthly, some platforms offer their (employed) couriers a fixed wage on top of what they receive per order [59]. This provides a certain degree of income security during the periods with fewer orders. During the fieldwork, the difference in dissatisfaction between couriers who were entitled to a fixed wage and those who were not was indeed noticeable, particularly during the period of Ramadan when the number of orders declined sharply.

#### d) Vulnerability

The dimension of vulnerability aims to capture adverse interpersonal relations with the employer (e.g., discrimination, inaccuracies or abuse regarding wages or administrative requirements: [69]). It consists of four sub-dimensions: authoritarian treatment, abusive treatment, being uninformed and being cheated [43].

The main difference with employees stems from the fact that there is no dual relationship between an employer and employee. Rather, there is a so-called triangular relationship between the courier, the platform and the customer/restaurant [70]. Food delivery platforms often position themselves as labour market

intermediaries [65]. Usually there is no direct contact between the platform and the courier [71]. Despite the ‘blurred nature’ of the employment relationship, most platforms instruct, monitor and evaluate food couriers remotely [72]. Work settings and jobs are algorithmically assigned, optimised, and evaluated through tracked data [73]. Hence, there may also be instances of abuse, inaccuracies and authoritarian treatment. The adapted sub-dimensions are briefly explained below.

Firstly, the performance of the couriers is algorithmically evaluated through the platform app [72]. Platforms collect information about their delivery speed, percentage of refused rides and customer reviews [74]. How this is realised and the criteria used is unclear [74], leading to information asymmetry between the worker and employer [65]. This became particularly apparent during the fieldwork when we observed groups of couriers who had long discussions about why some always got rides and others did not, and how this related to their use of the application (e.g., refusing too many rides or activating the app at the ‘right’ location). The information asymmetry and opacity of the algorithm make the detection of potential discrimination more difficult. The dimension of abusive treatment therefore gauged the feeling of being discriminated against at work and fear of complaining about it.

Secondly, couriers are sometimes ‘dismissed’ by having their accounts blocked based on these evaluations [6]. Fieldwork findings confirmed the couriers’ concerns about this: “A courier shows me an e-mail on his mobile phone saying that his orders are not delivered quickly enough, that there have been complaints from customers and that his account may therefore be blocked. He is angry that he cannot contact the platform to defend himself” (authors’ own fieldnotes). The ‘authoritarian treatment’ dimension thus explored fear of being excluded from the platform and a feeling of easily being replaced. Fieldwork observations also confirmed the importance of a question in the survey about being able to contact the platform in case of problems.

Finally, the original EPRES-indicator for ‘being cheated’ was used as a fourth subdimension (Table S3, appendix) as it questions whether wages and other conditions are paid out correctly. This refers to often reported complaints from couriers about unfair disbursements [68].

#### e) Undesirable working times

This dimension aims to evaluate the harmfulness of working times [43] based on the idea that irregular,

excessively long, unpredictable and unsocial working hours negatively affect the well-being of workers [75]. For food couriers, the dimension of working times concerns the (high) average weekly working hours and the (unsocial) times when couriers work.

The challenge here is to capture the difference between working as a courier as a main job, an additional job or with another status (e.g., being a student). For the latter type of workers, the number of weekly working hours is likely much lower on average, than for full-time couriers. This is also confirmed by the (scarce) figures that exist on the subject: ETUI [18] reports that delivery workers work only 14 hours per week on average as a courier. Couriers who do the work as their main job generally find themselves in a more precarious position – particularly because of the strongly fluctuating and often inadequate income [44] and the aforementioned lack of social protection. This contrast also became clear during fieldwork. For example, one occasional courier described the job as “a good way to get physical exercise” and said he appreciated the “extra pennies,” while another courier who worked as a pharmacist in his home country (Bangladesh) and now works as a full-time courier described the job as “physically demanding and not well paid” (authors’ own fieldnotes). Ironically, a high number of working hours in this job usually indicates a disadvantageous employment situation. Respondents were therefore asked how many hours per week they worked as couriers on average. When coding this item, we assumed that working more than 32 hours per week as a courier (4 eight-hour days) is too much to be a ‘side hustle’, and therefore indicates a high(er) degree of job dependence.

The second subdimension concerns the extent to which couriers’ working hours disrupt their social lives. The fieldwork and literature show that couriers typically work at times when most people have leisure time [10]. Such ‘unsocial working hours’ constitute a psychosocial risk factor as it can be detrimental to workers’ work-life balance and family life [38]. Respondents were therefore asked how often they worked evenings, weekends and public holidays, on average.

#### f) Economic unsustainability

Economic unsustainability aims to capture different aspects of remuneration issues [2]. This extends beyond monthly pay to encompass non-wage benefits, involuntary over/under-employment and unpaid overtime [43]. The main challenge in adapting this dimension to food couriers concerns the correct interpretation of (low) incomes in relation to

other potential jobs and employment status (student, unemployed, etc.), and finding alternative indicators for the traditional economic remuneration of employees.

Firstly, couriers do not always know how much their net income is, as it is usually volatile [8] and the amount of taxes they must pay is not always clear [59]. Therefore, an estimation of the average gross monthly income was surveyed. Since the job of food courier is typically characterised by short working hours, this usually translates into relatively low monthly incomes derived from the gig job [20]. The impact of those (low) incomes on economic stability, however, varies according to the dependence on that income [44]. Hence, common wage standards do not apply to food couriers. Nevertheless, even within these generally low incomes there is a variation in payment. The aforementioned differences in ride allocation by the algorithm [65] play a role here, but also the number of deliveries a courier makes in a given time (depending on the vehicle, personal speed, age, etc.). To capture wage variation within these generally low incomes, they were coded by quartile in the EPRES-gw (Table 2). As such, classification is based on income distribution rather than a predetermined, uniform wage standard.

Given this dubious role of income, other subdimensions should also be considered to capture economic unsustainability. The second subdimension concerns a lack of non-wage benefits. Of course, specific benefits relevant to couriers had to be included. During the fieldwork, informal discussions with couriers regularly revealed dissatisfaction with the loss of non-wage benefits that were previously provided, such as rain premiums, peak-period bonuses or a covid-premium. Similar conclusions emerged from another study [68]. Therefore, a question on this subject was included in the survey.

The third subdimension, ‘unpaid overtime’ is frequently mentioned as an aspect of the economic instability of food couriers [38]. Due to long waiting times in restaurants and with customers, traffic congestion or other obstacles on the road, couriers sometimes work long, unpaid hours within the piece-rate payment system [59]. Therefore, in the survey ‘unpaid overtime’ was operationalised as the estimated percentage of (unpaid) waiting times.

The last dimension, underemployment, could be taken from the original EPRES without much modification (Table 2) and reflects the overall satisfaction with the available number of weekly working hours.

#### g) Low employability opportunities

This last dimension measures the extent to which a job is a so-called ‘dead-end job’, or in other words a job with no possibilities for career progress [43]. The indicator that is used for this dimension in EPRES is ‘access to employer subsidised training’ [49].

Training might be important for food couriers because of their high turnover rates [30]. Platforms also propagate that the job of courier could be a steppingstone to a long-term career (e.g., ‘Deliveroo Academy’). The challenge in adapting this dimension lies in capturing the different types of training and employment opportunities that platforms may offer. Some platforms offer courier-trainings. For example, DLP Deliveroo in Italy developed e-learning platforms with courses on road safety and health [68]. However, training for food couriers is still scarce and the training offered is usually fairly basic [59]. Moreover, the value of a training is likely to vary from courier to courier. The concept of ‘training’ was therefore approached broadly. We surveyed whether couriers themselves think that the job gives them the opportunity to learn something new. [Insert: Table 2. Operationalisation of the EPRES-gw based on employment research in Belgium and adapted to food couriers.]

#### 4.2. Quantitative results: Validation of the EPRES-gw

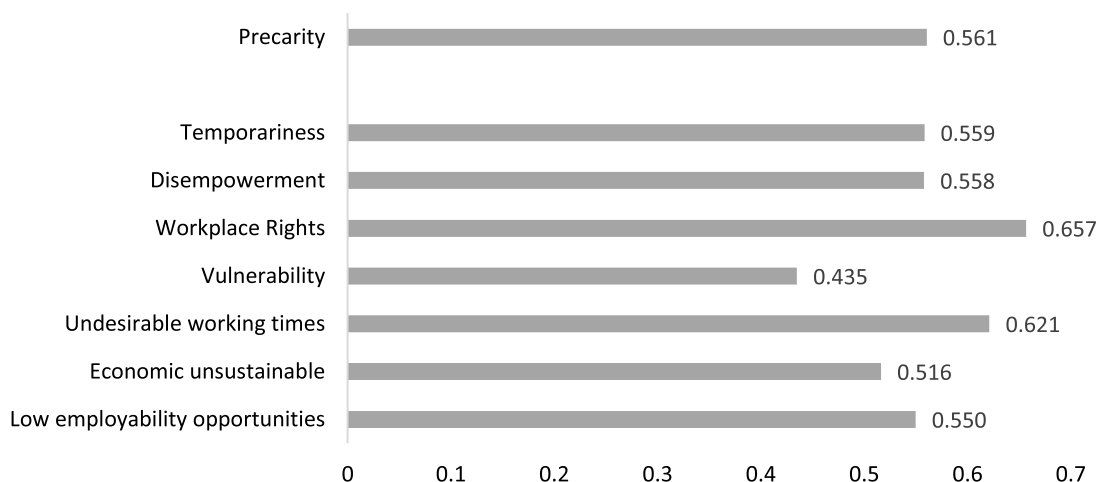
In this second part, the results of the EPRES-gw ( $n=99$ ) are validated quantitatively in two steps, a

reliability test (RQ2.1) and an external validation (RQ2.2).

##### 4.2.1. Reliability

EPRES-gw was constructed as shown in Table 2. To maximize the sample size, means imputation was performed: for those dimensions including missing values, the average score on the other dimensions was attributed in those cases where no more than five of the seven dimensions had missing values [76]. The final imputed EPRES-gw scale contains 99 respondents (instead of  $n=70$  when listwise deletion would have been applied). The imputed scale and the scale constructed out of cases without missing values differ little in their scores on descriptive statistics and relationship to poor well-being, as the sensitivity analysis shows (Table S1, appendix). Table 2 also shows the coding of the (sub)dimensions of the EPRES-gw. Cronbach’s Alpha is always indicated when a sub-dimension contains more than one item (all scores are above 0.6). The appendix also contains a correlation matrix of EPRES-gw and the sub-dimensions (Table S2, appendix).

Figure 1 shows the mean scores on the precarity scale and its sub-dimensions. The mean score on precarity for all couriers in the sample is 0.561 (a score of 1 expresses the most precarious situation). The dimensions ‘workplace rights’ ( $M=0.657$ ) and ‘undesirable working times’ ( $M=0.621$ ) have the highest mean scores. ‘Vulnerability’ ( $M=0.435$ ) has the lowest mean score.



**Source:** EPRES-gw survey, own analysis.

Fig. 1. Precarity and its dimensions for Brussels food couriers ( $n=99$ ).

Table 3  
Precarity scores and poor well-being scores per demographic and socio-economic group ( $n = 99$ )

	Precarity		Poor well-being	
	Mean (S.D.)	n	Mean (S.D.)	n
All workers	0.561 (0.138)	99	0.419 (0.217)	96
Sex (non-sig. $p$ -value)				
Male	0.565 (0.138)	87	0.410 (0.218)	88
Female	0.506 (0.158)	8	0.520 (0.184)	8
Age (non-sig. $p$ -value)				
25 or younger	0.546 (0.138)	50	0.428 (0.213)	51
26 – 35	0.584 (0.143)	36	0.404 (0.234)	36
Older than 35	0.520 (0.138)	8	0.425 (0.196)	8
Educational level (non-sig. $p$ -value)				
No education + Higher secondary education	0.541 (0.149)	34	0.381 (0.221)	35
Higher education	0.570 (0.142)	43	0.419 (0.209)	42
Unrecognised diploma	0.582 (0.157)	15	0.488 (0.241)	16
Employment Status (non-sig. $p$ -value)				
Other job besides food courier	0.571 (0.132)	21	0.328 (0.167)	20
Student	0.532 (0.123)	40	0.433 (0.171)	42
Looking for a job	0.567 (0.156)	19	0.428 (0.260)	20
Exclusively working as a food courier	0.608 (0.186)	12	0.506 (0.290)	11
Migration background (non-sig. $p$ -value)				
Born in Belgium and both parents born in Belgium	0.532 (0.121)	15	0.405 (0.166)	15
Born in Belgium and (one of the) parents not born in Belgium	0.587 (0.143)	27	0.383 (0.232)	26
Not born in Belgium and (one of the) parents not born in Belgium	0.555 (0.145)	52	0.433 (0.223)	54

Source: EPRES-gw survey (own analysis). ANOVA,  $t$ -test and *post hoc* test with Bonferroni correction; S.D. = Standard deviation; Sig. = Significance level.

#### 4.2.2. External validity

Table 3 shows the EPRES-gw scores for a range of demographic and socio-economic groups. The analysis of variance does not show any significant differences in mean EPRES-scores when applying a 95% significance threshold (which is rather strict given the limited statistical power of the sample). A few groups show differences in the mean EPRES-score. This is the case for employment status, which indicated higher precariousness especially among respondents who work exclusively as food couriers and have no other job ( $M = 0.608$ ). The same group also shows a higher score on poor well-being ( $M = 0.506$ ). In terms of educational level, higher precariousness ( $M = 0.582$ ) and poor well-being ( $M = 0.488$ ) scores can be noted between the couriers with a diploma that is not recognised in Belgium and the other groups.

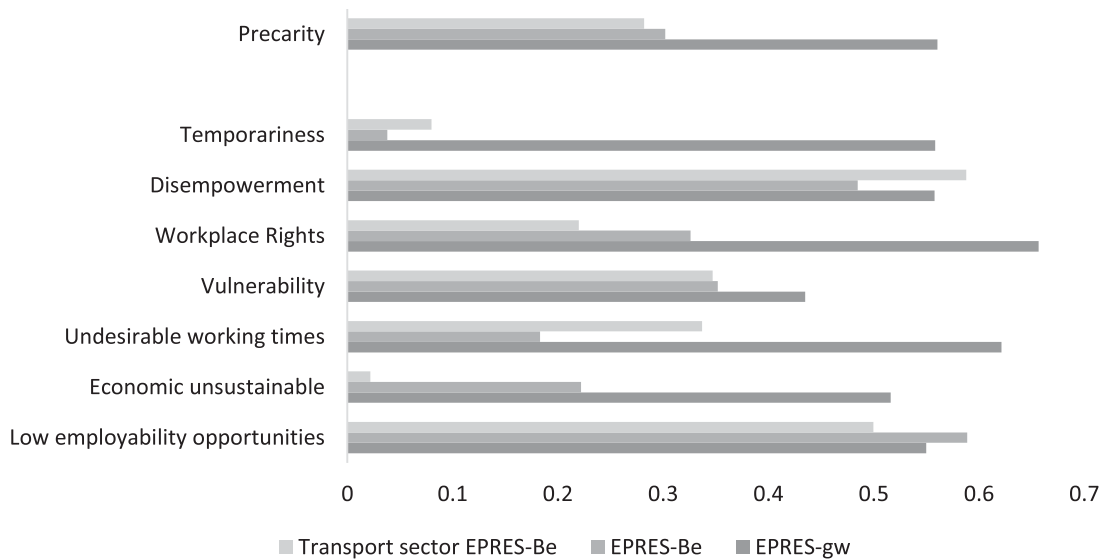
Table 4 shows the correlations of EPRES-gw and its dimensions with poor well-being. Precarity correlates significantly and positively with poor well-being ( $\rho = 0.373$  \*\*\*). Three of the seven dimensions of precarity individually also correlate significantly and positively with poor well-being. These are respectively workplace rights ( $\rho = 0.480$  \*\*\*), economic unsustainability ( $\rho = 0.412$  \*\*\*) and disempowerment ( $\rho = 0.238$  \*).

Table 4  
Pearson correlations between precarity, its dimensions and poor well-being

	Poor well-being	
	$\rho$ (Sig.)	n
Precarity	0.373 (***)	93
Temporariness	-0.063	91
Disempowerment	0.238 (*)	91
Workplace Rights	0.480 (***)	87
Vulnerability	0.136	93
Undesirable working times	0.064	88
Economic unsustainability	0.412 (***)	88
Low employability opportunities	0.189	96

Source: EPRES-gw survey (own analysis). \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . Sig. = Significance level.

Figure 2 completes the external validation and concerns a general comparison between three groups: food couriers (using EPRES-gw), a sample of 2,332 Belgian employees who filled-out the EPRES-Be survey in 2019 (see: [49]) and workers active in the transport sector ( $n = 50$ ) derived from the same EPRES-Be sample. The comparison between the two scales should be interpreted with caution given the small sample size and the aforementioned differences in scale composition. Nevertheless, EPRES-gw is constructed in such a way that the dimensions should theoretically reflect the same as the EPRES-Be dimensions. On average, food couriers score higher



Source: *EPRES-gw survey (own analysis)*.

Fig. 2. A comparison between EPRES-Be transport sector ( $n = 50$ ), EPRES-Be ( $n = 2,332$ ) and EPRES-gw ( $n = 99$ ).

on precarity ( $M = 0.561$ ) than the other two groups (EPRES-Be:  $M = 0.302$  and EPRES-Be transport sector:  $M = 0.282$ ). Consideration of the dimensions illustrates that the biggest differences between the food couriers and the other groups may be found in the dimensions of ‘temporariness’, ‘workplace rights’, ‘undesirable working times’ and ‘economic unsustainability’.

## 5. Conclusion

### 5.1. Theoretical implications

Within the large body of emerging literature on working conditions in the gig economy remarkably little attention has been paid to how we can empirically assess these conditions. Nevertheless, both within research and policy circles there is a demand for clear criteria against which gig work can be classified and evaluated. In this pilot study, we therefore developed and tested a measurement instrument formally to assess employment precariousness among food couriers.

The seven-dimensional conceptualisation of precarity proved theoretically useful to address the various aspects related to precarious employment in gig work, even though it needed prior adaptation to the context of food couriers. That main finding was confirmed by the quantitative validation of the

scale. The scale showed acceptable reliability with Cronbach’s Alphas above 0.6 in the sub-dimensions (H2.1). The external validation indicated that the EPRES-gw scores vary across different demographic and socio-economic groups (H2.2). However, statistical significance using a 95% confidence interval could be identified, mainly due to the low statistical power of our sample. Furthermore, in line with prior expectations, there was a positive correlation between the EPRES-gw and poor well-being (H2.3). Given that the relationship with poor well-being is such an essential feature of the EPRES [35], this provides a strong argument for the validity of the EPRES-gw as an assessment of employment precariousness among food couriers. Overall, this is a promising finding supporting the extension of this empirical research to a larger sample of food couriers and the development of a similar scale for other types of gig workers. Although several dimensions also correlated separately with poor well-being, the significant correlation with the scale as a whole demonstrates that it is the accumulation of the seven dimensions that establishes a precarious work situation [42].

Finally, the comparison between EPRES-gw (for food couriers) and EPRES-Be (from previous research on Belgian employees) also proved useful. Despite the inevitable differences between the two scales, the findings are consistent with our expectations based on the literature. The precarity score of couriers is high compared to transport

workers and the entire EPRES-Be sample, indicating that their jobs are more precarious than those of employee (sub)populations [7]. The largest differences were situated in the dimensions of ‘temporariness’, ‘workplace rights’, ‘undesirable working times’ and ‘economic unsustainability’. These are also frequently cited negative job characteristics in research on gig work [77, 78]. Moreover, they cover the main demands of trade unions regarding gig workers’ rights (employee contracts, hourly wages, access to occupational healthcare) [16]. The smaller differences found in the ‘disempowerment’ and ‘low employability opportunities’ dimensions are also noteworthy. This observation aligns with the literature, as the fragmentation of trade unions and labour movements is a general trend not limited to the gig economy [30]. Lack of training is a problem in many other sectors included in the EPRES-Be sample (such as cleaning and construction: [79]). Hence, this finding contributes to the thesis of several ‘precarity-scholars’ who theorise gig work as an extreme case within a much wider trend of precarisation, particularly in the lower-skilled ‘bottom’ of the labour market [23, 80, 81].

## 5.2. *Limitations and directions for future research*

A first important limitation of this study relates to the heterogeneity of the group of gig workers. As mentioned before, a measurement instrument for precarity must distinguish between food couriers who do this as their main job and those who do it as a side-job or as students [44]. This was considered in the adaptation process, for example, by avoiding uniform thresholds (‘economic unsustainability’) or deliberately taking a ‘broad’ approach to certain dimensions (‘low employability opportunities’). Furthermore, we also evaluated whether the precarity scores differed by employment status (Table 3). However, the instrument itself did not distinguish between these positions (e.g., by applying a different coding per group). Taking this heterogeneity into account constitutes a major challenge for future research [44] – and certainly requires a higher number of observations. A second related limitation, stems from the fragmented nature of careers in the gig economy [23]. Given the high turnover, a cross-sectional design offers little insight into career perspectives and long-term security. This is also likely to vary across gig workers and sectors [64]. In this study, this was briefly touched upon in the ‘low employ-

ability opportunities’ dimension. More insight into employment trajectories is required [64]. Mapping gig workers’ motivations and movements across the labour market could make a relevant contribution in that respect. The cross-sectional nature of the study also prevents us from making statements about causality.

Lastly, due to the adopted recruitment strategy, a representative sample of the Brussels, platform-based food delivery couriers was not obtained. Implementing probability sampling techniques is inconvenient in a population about whom so little information is available. There is no clear sampling frame as the total number of food couriers operating in a city like Brussels is unknown [10]. Given the lack of data, this study could make a relevant contribution to the field albeit using a ‘convenience sample’. This is a convenient design in hard-to-reach populations, as completing a short online survey on a smartphone requires relatively little effort. The tailored survey allowed us to accurately gauge the aspects of the employment relationship of importance to this study.

This study also highlighted significant issues from a policy perspective. Processes such as the platformisation and de-standardisation of labour markets change employment conditions and relations [82] and entail new social risks for the health and well-being of workers [17]. Growing numbers of precariously employed gig workers with a poor overall wellbeing undermine sustainable employment in the digital age. Policymakers should therefore address these new health risks posed by the digital economy. A formal, empirical assessment of employment conditions and relations within the gig economy will be a much-needed tool in this endeavour.

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fundamental to the data collection process and the overall success of this study.

### Ethics statement

The study was approved by the Ethics Committee Humanities and Social Sciences (ECHW) at the Vrije Universiteit Brussel (ECHW\_321 and ECHW\_322). The study was conducted in accordance with the ethical principles and guidelines outlined by the ECHW at the Vrije Universiteit Brussel.

### Conflict of interest

Not applicable.

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## Appendix

Table S1  
Sensitivity analysis precariousness scale (EPRES-gw) imputed and not imputed

	EPRES-gw ( <i>n</i> = 70)	EPRES-gw imputed ( <i>n</i> = 99)
Mean (S.D.)	0.557 (0.128)	0.561 (0.138)
Median	0.566	0.571
Pearson correlation with well-being (Sig.)	0.330 (**)	0.373 (***)
Regression with well-being (Sig.)	$\beta = 0.529$ (**)	$\beta = 0.581$ (***)

Source: EPRES-gw survey (own analysis). \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Sig. = Significance level.

Table S2  
Pearson correlation matrix EPRES-gw and its dimensions

Pearson correlation (Sig.)	<b>Precarity</b>	<i>Temporariness</i>	<i>Disempowerment</i>	<i>Workplace Rights</i>	<i>Vulnerability</i>	<i>Undesirable working times</i>	<i>Economic unsustainability</i>	<i>Low employability opportunities</i>
<b>Precarity</b>	1	0.333***	0.115	0.644***	0.574***	0.276**	0.486***	0.698***
<i>Temporariness</i>	0.333 ***	1	-0.247*	0.181	-0.147	0.068	-0.029	0.017
<i>Disempowerment</i>	0.115	-0.247*	1	-0.279**	0.028	0.078	0.231*	-0.050
<i>Workplace Rights</i>	0.644***	0.181	-0.279**	1	0.260*	-0.071	0.369***	0.347***
<i>Vulnerability</i>	0.574***	-0.147	0.028	0.260*	1	0.175	0.207	0.359***
<i>Undesirable working times</i>	0.276**	0.068	0.078	-0.071	0.175	1	-0.278*	-0.032
<i>Economic unsustainability</i>	0.486***	-0.029	0.231*	0.369***	0.207	-0.278*	1	0.246*
<i>Low employability opportunities</i>	0.698***	0.017	-0.050	0.347***	0.359***	-0.032	0.246*	1

Source: EPRES-gw survey (own analysis). \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Sig. = Significance level.

Table S3

Operationalisation of the EPRES-gw based on employment research in Belgium and adapted to food couriers. Similarities and differences with the original EPRES-Be

Dimensions	Original EPRES-Be	EPRES-gw for food couriers	Indicators Response options and coding (0 = least precarious, 1 = most precarious)
<b>1. Temporariness</b>	<p><b>Type of contract</b> Contract of indefinite duration or not</p>	<p><b>Variations within unstable contracts</b> A contract of indefinite duration, a job student, a temporary contract, a temporary agency job, a flexi-job, a self-employed contract (P2P, fully independent, student-self-employed) or no contract</p>	<p><b>Variations within unstable contracts</b> (<math>\alpha = \text{N.A.}</math>): With what contract do you work as a food courier at your platform? 0. As an employee with a contract of indefinite duration + As a job student 0.33 As an employee with a temporary contract + A temporary agency job + As a flexi-job 0.66 As a self-employed (P2P, fully independent) + As a self-employed student 1. No contract + I don't know</p>
<b>2. Disempowerment</b>	<p><b>No worker representation</b> Involvement of trade unions in the regulation of the following working conditions: hourly wages and salaries; social benefits and rights</p> <p><b>No participation in workplace issues</b> Involvement of the worker in the regulation of the following working conditions: the work tasks of the day; the weekly or monthly schedule</p>	<p><b>No worker representation</b> Being a member of an organisation that defends food couriers' interests (including alternative interest groups)</p> <p><b>No participation in workplace issues</b> Involvement of the worker in the regulation of the following working conditions: how often one works; which jobs one can take on; the way one does their job; the working times</p>	<p><b>No worker representation</b> (<math>\alpha = \text{N.A.}</math>) Are you a member of an organisation that defends your interests? 0. Yes (trade union or riders collective) 1. No</p> <p><b>No participation in workplace issues</b> (<math>\alpha = 0.812</math>) How are the following four aspects of your work arranged? Think about the most common situation. <i>How often I work.</i> <i>Which jobs I take on.</i> <i>The way I do my job.</i> <i>The times when I work.</i> 0. I choose this myself 0.5 I partly choose this myself, and partly depend on the platform and the app 1. It is imposed on me without consultation by the platform and the app</p>
<b>3. Workplace rights</b>	<p><b>Lacking access to established workplace rights</b> (e.g., paid holidays, paid sick leave, pensions, taking time off for important reasons, ...)</p>	<p><b>Variations within a lack of workplace rights</b> (e.g., contributions to the costs of equipment, medical insurance, a fixed wage, etc.)</p>	<p><b>A lack of four workplace rights</b> (<math>\alpha = 0.774</math>) "My platform contributes to the costs of my equipment (e.g. a helmet, bicycle, clothing, mobile phone,...)" "If I have an accident while performing my job, I am medically insured" "If I cause damage to third parties or their goods during my work, I am insured" "I am entitled to a fixed wage in addition to the amount I receive per order delivered" 0. Totally agree + Slightly agree 0.5 Partially agree, partially disagree 1. Slightly disagree + Totally disagree + I don't know</p>

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Table S3  
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Dimensions	Original EPRES-Be	EPRES-gw for food couriers	Indicators Response options and coding (0 = least precarious, 1 = most precarious)
	<b>No exercise of rights</b> Not being able to exercise the rights one is entitled to	<b>No exercise of rights</b> This subdimension was not included because couriers cannot legally enforce the above rights, as they are not entitled to them	
<b>4. Vulnerability</b>	<b>Authoritarian treatment</b> Adverse aspects in an authoritarian relationship between employer and employee (e.g., fear of asking for better working conditions, worrying about dismissal if someone is temporarily underperforming, feeling easily replaceable, etc.)	<b>Authoritarian treatment</b> Adverse aspects in an authoritarian relationship with the platform through the app and the associated algorithm (e.g., being concerned about exclusion from the platform, feelings of being easily replaceable, etc.)	<b>Authoritarian treatment</b> ( $\alpha = 0.615$ ) “If I temporarily underperform at work, I should be concerned about fewer job opportunities, less wage or exclusion from the platform” “If I were to participate in a protest action, I should be concerned about less job opportunities, less pay or exclusion from the platform” “The platform through which I work (most) for gives me the feeling that I am easily replaceable.” 0. Slightly disagree + Totally disagree 0.5 Partly agree, partially disagree + I don’t know 1. Totally agree + Slightly agree
	<b>Abusive treatment</b> Abusive treatment by the employer towards the employee (e.g., discrimination, psychological and/or verbal abuse)	<b>Abusive treatment</b> Abusive treatment by the platform through the app, the associated algorithm and in relation to customers and restaurants (e.g., being treated unfairly or discriminately at work and fear to argue about it)	<b>Abusive treatment</b> ( $\alpha = 0.637$ ) “I am treated unfairly or discriminately at work” “If I were to be treated unfairly, I wouldn’t dare to argue.” 0. Slightly disagree + Totally disagree 0.5 Partly agree, partially disagree + I don’t know 1. Totally agree + Slightly agree
	<b>Being cheated</b> Incorrect administration of wage and employment conditions (e.g., payment of wages and bonuses)	<b>Being cheated</b> Incorrect administration of wage	<b>Being cheated</b> ( $\alpha = N.A.$ ) “The payment of my salary and optional premiums usually happens correctly.” 0. Totally agree + Slightly agree 0.5 Partially agree, partially disagree + I don’t know 1. Slightly disagree + Totally
	<b>Being uninformed</b> Being uninformed about the health and safety risks inherent to the job	<b>Being uninformed</b> Being uninformed about the health and safety risks inherent to the job and difficulties in communicating easily with the platform in case of a problem	<b>Being uninformed</b> ( $\alpha = 0.600$ ) “I am well informed about the health and safety risks inherent to my job” “If a problem arises, I can communicate easily with my platform in order to resolve it.” 0. Totally agree + Slightly agree 0.5 Partially agree, partially disagree + I don’t know 1. Slightly disagree + Totally

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Table S3  
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Dimensions	Original EPRES-Be	EPRES-gw for food couriers	Indicators Response options and coding (0 = least precarious, 1 = most precarious)
<b>5. Undesirable working times</b>	<b>Long working hours</b> High average number of working hours per week; High number of overtime hours per week	<b>Long working hours</b> High number of working hours per week as a courier on the platform through which one works most, indicating more dependence on this job	<b>Long working hours</b> ( $\alpha = \text{N.A.}$ ) How many hours per week do you work on average as a courier with the platform through which you work most? 0. 0–16 hours a week 0.5 17–32 hours a week 1. More than 32 hours a week
	<b>Working times irregularity</b> Often being stand-by for work	<b>Working times irregularity</b> Treated in the economic instability-dimension: unpaid overtime	
	<b>Unpredictable working times</b> Changing work schedules on a regular basis and not (or at the last minute) being informed of the changes	<b>Unpredictable working times</b> Treated in the disempowerment dimension: participation in setting working times	
	<b>Work at ‘unsocial’ times</b> Work often per month during the following moments: between 5 pm and 10 pm; nights; Saturdays; Sundays; during a public holiday	<b>Work at ‘unsocial’ times</b> Work often per month during the following moments: between 5 pm and 10 pm; weekends; during a public holiday	<b>Working during ‘unsocial’ times</b> ( $\alpha = 0.688$ ) Can you indicate how often you work on average per month at the following times? “ <i>I work... between 5 pm and 10 pm</i> ” “ <i>I work ... on weekends</i> ” “ <i>I work... on a public holiday</i> ” 0. Never + I don’t know 0.33 Sometimes 0.66 Regularly 1. Always
<b>6. Economic unsustainability</b>	<b>Low income</b> Low monthly net income from main paid job	<b>Low income</b> Low monthly gross income out of the job of courier via the platform through which one works most	<b>Low income</b> ( $\alpha = \text{N.A.}$ ) What is your monthly gross income (net of tax) that you earn as a courier via the platform through which you work most? 0. Two highest income quartiles 0.5 Second income quartile 1. Lowest income quartile
	<b>Lack of non-wage benefits</b> Eco vouchers, meal vouchers, gift vouchers	<b>Lack of non-wage benefits</b> Rain premium, corona premium, peak period premiums	<b>Lack of non-wage benefits</b> ( $\alpha = \text{N.A.}$ ) “ <i>I am entitled to at least one of the following reimbursements: rain premium, corona premium, peak period premiums</i> ” 0. Totally agree + Slightly agree 0.5 Partially agree, partially disagree 1. Slightly disagree + Totally disagree + I don’t know
	<b>Unpaid overtime</b> Treated in the working times-dimension (i.e., working times irregularity)	<b>Unpaid overtime</b> High number of unpaid working hours (e.g., waiting for an order, waiting for a ride, ...)	<b>Unpaid working time</b> ( $\alpha = \text{N.A.}$ ) How many of your working hours are unpaid (e.g., waiting for an order at a restaurant, waiting for a ride that you can accept, ...)? 0. < 10% 0.5 10% – 40% 1. > 40%

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Table S3  
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Dimensions	Original EPRES-Be	EPRES-gw for food couriers	Indicators Response options and coding (0 = least precarious, 1 = most precarious)
	<b>Underemployment</b> Being involuntary part time employed and/or wanting to work more hours than actually working	<b>Under/overemployment</b> Not being satisfied with the number of hours per week that one can work as a courier, both too many and too few working hours	<b>Under/overemployment</b> ( $\alpha = \text{N.A.}$ ): Are you satisfied with the number of hours per week that you can work as a courier? 0. Yes 0.5. No, I would like to work less 1. No, I would like to work more
<b>7. Low employability opportunities</b>	<b>Lack of training opportunities</b> Have not attended any training paid for or provided by the employer in the past 12 months	<b>Lack of opportunities</b> Not being given the opportunity to learn something new	<b>Lack of opportunities</b> ( $\alpha = \text{N.A.}$ ): <i>“The platform through which I work (most) offers me the opportunity to learn something new.”</i> 0. Totally agree + Slightly agree 0.5 Partly agree, partially disagree + I don't know 1. Slightly disagree + Totally disagree