From Measures to Count Nouns: Complex Numerical Measure Nouns in Russian

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The Issue. Colloquial Russian uses **measure nouns**, morphologically complex nouns constructed out a numeral, measure unit and a nominal suffix -ka as in (1).

(1) a. **trex - litrov - ka** samogona b. **sto- grammov- ka** vodki three^{GEN}-liter GEN PL -ka moonshine GEN hundred^{NOM}-gram^{GEN PL}-ka vodka 'a three-liter jar/bottle of moonshine' 'a 100-gram glass of vodka'

Measure nouns look like measure expressions such as *three liters* in *three liters of milk*, but while *three liters* expresses a measure property, these nouns denote objects (jars, bottles, glasses) which have these properties. They can be sortal nouns and can be modified by adjectives (2).

- (2) taščit' napolnennye **pjati-litrov-ki** okazalos' ne v primer tjaželej pustyx
 - 'It was incomparably harder to carry full five-liter (plastic) jars than empty ones.' [Pjatno, P.Kornev]
- (2) shows that measure nouns are expressions of type <e,t>. (3a) shows these nouns are count predicates denoting atomic disjoint entities since they can be pluralized, modified by numerals and be antecedents of distributive operators. They cannot be used as adjectival modifiers of other nouns (3b) (though like other nouns they can be used appositively).
- (3) a. (Pjat') trex-litrov-ok stojali odna na drugoj b. *trex-litrov- ka banka 'Five three-liter jars stood on top of each other.' three^{GEN}-liter GEN PL -ka jar

These container nouns are a subclass of a wider range of complex nouns built of expressions denoting measures in different dimensions and denoting salient objects which have the stated properties (e.g. power: *sto-vat-ka* 'a 100-watt bulb; time: *pjati-let-ka* 'a five-year project'). Furthermore, these nouns are used very productively. *Stogrammovka* in (1b) for example, may refer to a variety of objects which weigh 100 grams with the nature of the object being determined by context (e.g. a 100- ml bottle for perfume, an ultra-light coat, a ball (of yarn) etc..). I argue that (i) these nouns are not measure predicates but genuine count nouns at type <e,t> denoting objects with certain measure properties; (ii) they are derived via an operation which shifts measure predicates expressing measure properties into nouns denoting entities that have these properties; (iii) complex container nouns in (1) like other count container nouns (e.g. *glass*) are used as classifiers in both counting and measuring contexts.

Semantic interpretation. The -ka suffix in Russian is used to derive count nouns from lexical items of different syntactic categories including adjectives and nouns modified by numerals, or nominal measure phrases (NMPs) (cf. Vinogradov 1960). Measure nouns then could be formed either directly from NMPs used in pseudo partitives such as sto gramm(ov)^{GEN} muki ^{GEN} '100 grams of flour' or from complex measure adjectives, e.g stogrammovye^{ADJ} jabloki '100-gram apples' (arguments for either analysis are available; details in the talk). Both measure adjectives and NMPs have been analyzed as intersective predicate modifiers denoting measure properties (i.e. the property of having a measure value on a dimensional scale calibrated in certain units) to entities/sums of entities (4) (Rothstein 2011/2017, Landman 2016).

- (4) a. [hundred grams/hundred-gram] = λx . MEAS weight gram (x) = 100
 - b. [a hundred grams of flour]]= λx . FLOUR(x) \wedge MEAS WEIGHT GRAM (x)=100 The set of sums of flour that weigh 100 grams
 - c. [a hundred -gram apple] = λx . APPLE(x) \wedge MEAS weight GRAM(x) The set of apples such that each weighs 100 grams

Measure nouns are then derived via a nominalization operation, expressed by the -ka suffix, which shifts intersective predicate modifiers expressing measure properties as in (4a) to count nouns (N_C) denoting objects which have these measure properties (5).

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(5) a. [[- ka]] = \lambda P_{\text{MEAS}} \lambda x. N_{\text{C}}(x) \wedge P_{\text{MEAS}}(x)
b. [[stogrammovka]] = \lambda P_{\text{MEAS}} \lambda x. N_{\text{C}}(x) \wedge P_{\text{MEAS}}(x) (\lambda x. P_{\text{WEIGHT GRAM}}(x)= 100) = \lambda x. N_{\text{C}}(x) \wedge \text{MEAS}_{\text{WEIGHT GRAM}}(x) = 100
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The set of contextually determined entities (e.g. jackets, yarn balls etc..) that weigh 100 grams Such shifts are not un-known. Other intersective adjectives can shift from predicates expressing properties to nouns denoting individuals which have those properties, as for example in (6). The difference is that with measure modifiers this shift is overtly expressed through -ka.

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(6) a. On vzroslyj celovek <sup>SG</sup> b. Nekotorye <sup>PL</sup> vzroslye <sup>PL</sup> vedut sebja kak deti 
'He is a grown up person.' 'Some grown-up people behave as children.'
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Container measure nouns. The analysis in (5) extends to container nouns as in (7). We assume that containers are objects with holes, as argued in Casati &Varzi 1999, and that these holes are themselves objects with properties.

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    (7) a. [stogrammovka] = λx. N<sub>CONTAINERC</sub> (x) Λ MEAS <sub>VOL GRAM</sub> (HOLE(x))= 100
        The set of contextually determined containers whose volume is 100 grams<sup>1</sup>
    b. [trexlitrovka] = λx. N<sub>CONTAINERC</sub> (x) Λ MEAS <sub>VOL LITER</sub> (HOLE(x))= 3
        The set of contextually determined containers whose volume is 3 liters
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Shifts from a measure interpretation to a container interpretation have been discussed in Khrizman et al. (2015) who show that lexical measures like *liter* shift to a container reading, e.g. in *I broke a liter of milk*. They argue that in such cases *liter* is reinterpreted as a container whose contents measure 1 liter in volume. I do not adopt this for measure nouns like (1), since unlike *liter* they have non-relational uses at type <e,t>, so the measure properties must apply to containers and not to contents.

Classifier uses. We argued that container measure nouns are count nouns at type <e,t>. It is known that count nouns denoting containers easily shift to a relational classifier interpretation (*He handed me a glass of wine*) and to a measure interpretation where the container indicates a unit of measure (*There are two glasses of wine in this stew.*) (cf. Rothstein 2011/17, P&B 2012, Landman 2004/16). If measure nouns are count container nouns, we correctly predict that they have both these uses. (8) illustrates a count container interpretation and (9) shows that they are used as *ad hoc* measure units in approximative contexts (cf. P&B 2012, Rothstein 2017). In (9) the speaker uses the noun to express that he estimates that the amount of the berries on the bush is the amount which would fill a stereotypical three-liter jar.

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(8) kto-to razbil trexlitrovku<sup>ACC</sup> meda <sup>GEN</sup>
'Someone broke a three-liter jar of honey.' <a href="http://shkolazhizni.ru/psychology/articles/57018/">http://shkolazhizni.ru/psychology/articles/57018/</a>
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(9) This raspberry bush is full of berries!
da, zdes' kak minimum odna polnaja trexlitrovka (jagod)
yes, here as minimum one full three-liter-ka^{GEN} berry GEN PL
'Oh, yes there is at least one full three-liter jar of berries'

To sum up: Measure nouns in Russian are not measure expressions. They are count nouns denoting sets of objects derived from measure predicates. This work then brings further evidence for treating measure expressions like *three liters* as syntactic predicates as in Rothstein (2011/17) and extends this analysis to an entirely new domain of expressions.

¹ In Russian grams are sometimes used for volume, e.g. sto gramm(ov) vodki '100 grams of vodka'.