

Appendix 1: Onset clusters in English (not included: [h], [tʃ], [dʒ], [ŋ] and [ts])

Plain shaded (49): used (including rare words). *Shaded italic* (6): [lj, nj, sj, θj, dj, tj], used in some dialects.

Italic (3): [rw, ʒj, ʃj], transcribed the same [r, ʒ, ʃ].

	j	w	r	l	n	m	ʒ	z	v	ð	f	s	ʃ	θ	b	d	g	p	t	k
j	*	jw	jr	jl	jn	jm	jʒ	jz	jv	jð	jf	js	jʃ	jθ	jb	jd	jg	jp	jt	jk
w	wj	*	wr	wl	wn	wm	wʒ	wz	wv	wð	wf	ws	wʃ	wθ	wb	wd	wg	wp	wt	wk
r	rj	rw	*	rl	rn	rm	rʒ	rz	rv	rð	rf	rs	rʃ	rθ	rb	rd	rg	rp	rt	rk
l	<i>lj</i>	lw	lr	*	ln	lm	lʒ	lz	lv	lð	lf	ls	lʃ	lθ	lb	ld	lg	lp	lt	lk
n	<i>nj</i>	nw	nr	nl	*	nm	nʒ	nz	nv	nð	nf	ns	nʃ	nθ	nb	nd	ng	np	nt	nk
m	<i>mj</i>	mw	mr	ml	mn	*	mʒ	mz	mv	mð	mf	ms	mʃ	mθ	mb	md	mg	mp	mt	mk
ʒ	<i>ʒj</i>	ʒw	ʒr	ʒl	ʒn	ʒm	*	ʒz	ʒv	ʒð	ʒf	ʒs	ʒʃ	ʒθ	ʒb	ʒd	ʒg	ʒp	ʒt	ʒk
z	<i>zj</i>	zw	zr	zl	zn	zm	zʒ	*	zv	zð	zf	zs	zʃ	zθ	zb	zd	zg	zp	zt	zk
v	<i>vj</i>	vw	vr	vl	vn	vm	vʒ	vz	*	vð	vf	vs	vʃ	vθ	vb	vd	vg	vp	vt	vk
ð	ðj	ðw	ðr	ðl	ðn	ðm	ðʒ	ðz	ðv	*	ðf	ðs	ðʃ	ðθ	ðb	ðd	ðg	ðp	ðt	ðk
f	<i>fj</i>	fw	fr	fl	fn	fm	fʒ	fz	fv	fð	*	fs	fʃ	fθ	fb	fd	fg	fp	ft	fk
s	<i>sj</i>	sw	sr	sl	<i>sn</i>	<i>sm</i>	sʒ	sz	<i>sv</i>	sð	<i>sf</i>	*	sʃ	sθ	sb	sd	sg	<i>sp</i>	<i>st</i>	<i>sk</i>
ʃ	<i>ʃj</i>	ʃw	ʃr	ʃl	<i>ʃn</i>	<i>ʃm</i>	ʃʒ	ʃz	ʃv	ʃð	ʃf	ʃs	*	ʃθ	ʃb	ʃd	ʃg	ʃp	ʃt	ʃk
θ	<i>θj</i>	θw	θr	θl	θn	θm	θʒ	θz	θv	θð	θf	θs	θʃ	*	θb	θd	θg	θp	θt	θk
b	<i>bj</i>	bw	br	bl	bn	bm	bʒ	bz	bv	bð	bf	bs	bʃ	bθ	*	bd	bg	bp	bt	bk
d	<i>dj</i>	dw	dr	dl	dn	dm	dʒ	dz	dv	dð	df	ds	dʃ	dθ	db	*	dg	dp	dt	dk
g	<i>gj</i>	gw	gr	gl	gn	gm	gʒ	gz	gv	gð	gf	gs	gʃ	gθ	gb	gd	*	gp	gt	gk
p	<i>pj</i>	pw	pr	pl	pn	pm	pʒ	pz	pv	pð	pf	ps	pʃ	pθ	pb	pd	pg	*	pt	pk
t	<i>tj</i>	tw	tr	tl	tn	tm	tʒ	tz	tv	tð	tf	ts	tʃ	tθ	tb	td	tg	tp	*	tk
k	<i>kj</i>	kw	kr	kl	kn	km	kʒ	kz	kv	kð	kf	ks	kʃ	kθ	kb	kd	kg	kp	kt	*

Appendix 2: Onset clusters in Standard Chinese

Shaded (33): used (some speakers use [tɕ, tɕ^h, ɕ] for [tsj, ts^hj, sj]).

	j	w	ɥ	r	l	n	m	f	s	ɕ	x	ts	ts ^h	tɕ	tɕ ^h	p	p ^h	t	t ^h	k	k ^h
j	*	jw	jɥ	jr	jl	jn	jm	jf	js	jɕ	jx	jts	jts ^h	jtɕ	jtɕ ^h	jp	jp ^h	jt	jt ^h	jk	jk ^h
w	wj	*	Wɥ	wr	wl	wn	wm	wf	ws	wɕ	wx	wts	wts ^h	wtɕ	wtɕ ^h	wp	wp ^h	wt	wt ^h	wk	wk ^h
ɥ	ɥj	ɥw	*	ɥr	ɥl	ɥn	ɥm	ɥf	ɥs	ɥɕ	ɥx	ɥts	ɥts ^h	ɥtɕ	ɥtɕ ^h	ɥp	ɥp ^h	ɥt	ɥt ^h	ɥk	ɥk ^h
r	rj	rw	rɥ	*	rl	rn	rm	rf	rs	rɕ	rx	rts	rts ^h	rtɕ	rtɕ ^h	rp	rp ^h	rt	rt ^h	rk	rk ^h
l	lj	lw	lɥ	lr	*	ln	lm	lf	ls	lɕ	lx	lts	lts ^h	ltɕ	ltɕ ^h	lp	lp ^h	lt	lt ^h	lk	lk ^h
n	nj	nw	nɥ	nr	nl	*	nm	nf	ns	nɕ	nx	nts	nts ^h	ntɕ	ntɕ ^h	np	np ^h	nt	nt ^h	nk	nk ^h
m	mj	mw	mɥ	mr	ml	mn	*	mf	ms	mɕ	mx	mts	mts ^h	mtɕ	mtɕ ^h	mp	mp ^h	mt	mt ^h	mk	mk ^h
f	fj	fw	fɥ	fr	fl	fn	fm	*	fs	fɕ	fx	fts	fts ^h	ftɕ	ftɕ ^h	fp	fp ^h	ft	ft ^h	fk	fk ^h
s	sj	sw	sɥ	sr	sl	sn	sm	sf	*	sɕ	sx	sts	sts ^h	stɕ	stɕ ^h	sp	sp ^h	st	st ^h	sk	sk ^h
ɕ	ɕj	ɕw	ɕɥ	ɕr	ɕl	ɕn	ɕm	ɕf	ɕs	*	ɕx	ɕts	ɕts ^h	ɕtɕ	ɕtɕ ^h	ɕp	ɕp ^h	ɕt	ɕt ^h	ɕk	ɕk ^h
x	xj	xw	xɥ	xr	xl	xn	xm	xf	xs	xɕ	*	xts	xts ^h	xtɕ	xtɕ ^h	xp	xp ^h	xt	xt ^h	xk	xk ^h
ts	tsj	tsw	tɕ	tsr	tsl	tsn	tsm	tsf	tss	tɕ	tsx	*	tsts ^h	tstɕ	tstɕ ^h	tsp	tsp ^h	tst	tsts ^h	tsk	tsk ^h
ts ^h	ts ^h j	ts ^h w	ts ^h ɥ	ts ^h r	ts ^h l	ts ^h n	ts ^h m	ts ^h f	ts ^h s	ts ^h ɕ	ts ^h x	ts ^h ts	*	ts ^h tɕ	ts ^h tɕ ^h	ts ^h p	ts ^h p ^h	ts ^h t	ts ^h t ^h	ts ^h k	ts ^h k ^h
tɕ	tɕj	tɕw	tɕ	tɕr	tɕl	tɕn	tɕm	tɕf	tɕs	tɕ	tɕx	tɕts	tɕts ^h	*	tɕtɕ ^h	tɕp	tɕp ^h	tɕt	tɕt ^h	tɕk	tɕk ^h
tɕ ^h	tɕ ^h j	tɕ ^h w	tɕ ^h ɥ	tɕ ^h r	tɕ ^h l	tɕ ^h n	tɕ ^h m	tɕ ^h f	tɕ ^h s	tɕ ^h ɕ	tɕ ^h x	tɕ ^h ts	tɕ ^h ts ^h	tɕ ^h tɕ	*	tɕ ^h p	tɕ ^h p ^h	tɕ ^h t	tɕ ^h t ^h	tɕ ^h k	tɕ ^h k ^h
p	pj	pw	pɥ	pr	pl	pn	pm	pf	ps	pɕ	px	pts	pts ^h	ptɕ	ptɕ ^h	*	pp ^h	pt	pt ^h	pk	pk ^h
p ^h	p ^h j	p ^h w	p ^h ɥ	p ^h r	p ^h l	p ^h n	p ^h m	p ^h f	p ^h s	p ^h ɕ	p ^h x	p ^h ts	p ^h ts ^h	p ^h tɕ	p ^h tɕ ^h	p ^h p	*	p ^h t	p ^h t ^h	p ^h k	p ^h k ^h
t	tj	tw	tɥ	tr	tl	tn	tm	tf	ts	tɕ	tx	ts	tsts ^h	ttɕ	ttɕ ^h	tp	tp ^h	*	tt ^h	tk	tk ^h
t ^h	t ^h j	t ^h w	t ^h ɥ	t ^h r	t ^h l	t ^h n	t ^h m	t ^h f	t ^h s	t ^h ɕ	t ^h x	t ^h ts	t ^h ts ^h	t ^h tɕ	t ^h tɕ ^h	t ^h p	t ^h p ^h	t ^h t	*	t ^h k	t ^h k ^h
k	kj	kw	kɥ	kr	kl	kn	km	kf	ks	kɕ	kx	kts	kts ^h	ktɕ	ktɕ ^h	kp	kp ^h	kt	kt ^h	*	kk ^h
k ^h	k ^h j	k ^h w	k ^h ɥ	k ^h r	k ^h l	k ^h n	k ^h m	k ^h f	k ^h s	k ^h ɕ	k ^h x	k ^h ts	k ^h ts ^h	k ^h tɕ	k ^h tɕ ^h	k ^h p	k ^h p ^h	k ^h t	k ^h t ^h	k ^h k	*